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ABSTRACT

Concentrating on a sample of 30 secondary schools in the Oyo state of Western Nigeria, this study diagnoses the disparities in secondary education development there and seeks those factors that determine the unit cost of education. The status of secondary educational development in Oyo state is shown by examining those indicators showing such variables as access to secondary education, the quality of education (through student-teacher ratios), the efficiency of schools (through their average size), and the unit cost per student year. Critical areas requiring immediate improvement are highlighted. An analysis of enrollments and teaching manpower in 30 secondary schools, both rural and urban, provides data that are used to discover cost norms, such as unit cost, cost-size relationship, and rural-urban comparison of recurrent expenditures. In finding factors that are most important in determining unit costs of secondary education, the author identifies significant variables in the expenses of the 30 schools and then finds statistically the relative contributions of cost factors. He discovers that the factors crucial to cost are student-teacher ratio, average teacher salary, and enrollment. It is finally recommended that similar microlevel cost analyses be included in future educational planning. (JW)

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IIEP research report: ㊻

FACTORS INFLUENCING CURRENT COSTS OF SECONDARY EDUCATION IN THE OYO STATE OF NIGERIA

Remi S. Longe

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FOREWORD

Since mid-1979 the IIEP has conducted a research programme on educational establishment costs and resource allocation which is basically designed to provide a more thorough and more precise diagnosis of educational establishments' operating costs and conditions, to enable progress to be made towards four overall objectives:

- improved knowledge of educational costs and their components;
- improved utilization of resources;
- reduction of disparities between educational establishments;
- more accurate evaluation of the resources required for various measures to improve teaching efficiency.

This research, which was chiefly concerned with primary and secondary education, is at present moving in three new directions:

- extension of the field of analysis to out-of-school activities at the local level;
- economic evaluation of the introduction of productive work in the school;
- extension to the university sector.

Although the present study on "Factors influencing current costs of secondary education in the Oyo State of Nigeria" by Dr. Remi Longe, Lecturer, Department of Educational Management, University of Ibadan, has not been specifically undertaken under the IIEP research programme on costs, it is, however, very closely related to the main theme of this research. Since few studies of this kind have been carried out in Nigeria, we have found it appropriate and timely to publish it while Dr. Longe is studying at the IIEP.

It is based on data collected from 60 secondary schools. The sample is selected by the "probability proportional to size" method from the total of 236 secondary schools in Oyo State during the 1978/79 academic session.

The enrolment, teaching manpower and unit costs of the selected secondary schools are analysed; the factors identified to cause variations in the unit costs of the schools are studied through linear and multiple regression analysis.

The findings of the analysis show that student/teacher ratio is the most crucial factor influencing the unit cost of secondary education. Average teacher's salary, and enrolment are also found to have considerable influence on the unit cost; while the other factors such as, age of school, class size and the percentage of trained teachers in school, are found to have relatively little influence on the unit cost.

One of the main outcomes of the study is that it shows clearly that there is a need for an information system on costs, starting from the institutional level. Also, the study shows that it is possible to obtain acceptable data on school expenditures and financing through direct surveys in schools. These data could be used to understand the ways in which costs can be controlled in the future, to draw the attention of planners on the need of using resources more effectively and to understand the factors explaining disparities in unit expenditures between different schools and between different local government areas.

Michel Debeauvais
Director, IIEP

February 1982

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I wish to use this space to express my gratitude to God on to whom I lean at all times for all things. I also wish to thank all persons whose goodwill made this project a reality.

The Dean of Education, Professor P.O. Okunrotifa, who also is the Acting Head of the Department of Educational Management, for his interest in the project and also for the very useful suggestions.

Professor H.N. Pandit, who gave me much guidance in the course of this study; and Dr. S.D. Akangbou for his useful hints and suggestions.

The officials of the Ministry of Education, the Central Schools Board and the Principals of the schools used for the survey, and the University of Ibadan, for financial support.

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Remi S. Longe
University of Ibadan, 1981

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CHAPTER 1

INTRODUCTION

In recent years, the role of education in economic development has received considerable attention in academic circles and among government officials and economic planners. Many scholars have come to see education as the kingpin of economic development. Schultz[1] has argued that increase in the value of observed aggregate output in relation to the increase in the existing factors of production could be attributed to investment in human capital. Also, Myrdal[2], Galbraith[3], Bowman[4], and Harbison[5], supported this argument. In his own case, Harbison emphasized that human resources and not capital income or material resources constitute the ultimate basis for the wealth of a nation. Human resources, he continued, are the active factors while capital and natural resources are the passive factors of production. He went further to note that a country which is unable to develop the skills and knowledge of its people and to utilize them effectively in the national economy will be unable to develop anything else. Similarly, the report of the Public Service

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[1] Schultz, T.W. "Investment in Human Capital" American Economic Review, Vol. 51, 1961 pp. 1 - 17

[2] Myrdal, G. Economic Theory and Under-developed Regions. London: Duckworth, 1957

[3] Galbraith, J.K. The Affluent Society, London: Harmish Hamilton, 1958

[4] Bowman, M.J. "The Costing of Human Resources Development" Economics of Education, (Eds.) E.A.G. Robinson and J. Vaizey, 1966.

[5] Harbison, F. Human Resources as the Wealth of Nations London: Oxford University Press, 1973.

Commission (Udoji Report)[6], asserted that for societal transformation to take place, "human resources is a centre factor. Sound and relevant education of the individual is therefore fundamental to all else".

A number of reasons account for this new evaluation of education vis-a-vis economic growth. Firstly, education has a demonstrative effect whereby the people in less developed countries tend to imitate the educational investment patterns of the more developed countries, mainly because of the strong assumption that education is positively correlated with development. Also, people aspire and demand for education because of its practical effect in the society whereby people with higher education are rapidly being elevated to positions of responsibility and influence. Thirdly, many economists and government policy makers are inspired by reports of empirical studies on economic aspects of education which give support to the view that education can achieve rapid economic growth in the less developed countries.

On the other hand, there are those who are critical of the view that education has a crucial role to play in economic development. Some economists argue that increases in output due to the improvements in factors of production are not confined to labour, stressing that a degree of under-estimation similar to that which had been observed in the contribution of labour could also be observed in the contribution of physical capital if the same criteria were used in the estimation of improvements in the quality of both factors. It is in this context that Johnson[7] stated that the concerntration of the role of human capital has already proceeded far enough to generate the beginnings of a counter-revolution.

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[6] Federal Republic of Nigeria: The Public Service of Nigeria. Government Views on the Report of the Public Service review Commission, Lagos: Government Printers 1974.

The high esteem accorded to education seem to be more pronounced in developing countries where it is being argued that heavy investment in education has a great potentiality for enhancing rapid economic growth. With the belief that education is the kingpin of economic development, many less developed countries have embarked on large scale programmes of educational development. Hence, most of them have been allocating a large chunk of their resources to education. Tables 1.1 and 1.2 indicate an upward trend in the recurrent expenditure on education in the regions/states of Nigeria. The period 1965-60 in the Eastern region being an exception because of the civil war which was more severe in this part of the country. The Western region (Oyo State) however, consistently allocate more than 30 per cent of her total recurrent expenditure to education.

Apart from rapid expansion of the educational system, the new evaluation of education has led to considerable headway in the theoretical and empirical studies on the economics of education. Several scholars have looked at

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[7] Johnson, H.G. "Towards a Generalised Approach to Economic Development". Residual factors and Economic Growth, Paris: Organisation for Economic Co-operation and Development (OECD) 1964, pp 219-225.

Table 1.1 Trends in the recurrent expenditure on education in Nigeria: as a percentage of total recurrent expenditure. 1962-68

Financial Year	Western/ Mid-Western Region	Eastern Region	Northern Region	Federal Government
1963 - 64	33.2	33.1	20.7	5.8
1964 - 65	36.1	38.3	18.8	7.8
1965 - 66	36.3	34.7	18.1	8.3
1966 - 67	37.7	38.6	23.9	7.7
1967 - 68	32.1	-	27.4	9.3

Note:

- = Not available

Sources: Compiled from Callaway, A. and A. Musone. Financing of Education in Nigeria, Paris UNESCO-IIEP, 1968

Also

Briggs, B. Economic returns to secondary education in Nigeria. Unpublished Ph.D. Thesis, London, University of London, 1974.

Table 1.2 Trends in the recurrent expenditure on education in Nigeria as a percentage of total recurrent expenditure, 1972 - 78

Former Regions	S/No.	12 States	1972	S/No.	19 States	1976	1977	1978
Western Region	1	Western State	45.80	1	Oyo	50.50	-	39.0
				2	Ondo	-	-	-
				3	Ogun	-	-	-
	2	Mid-Western State	36.60	4	Bendel	-	-	-
Lagos	3	Lagos		5	Lagos	-	-	-
Eastern Region	4	East Central	34.50	6	Anambra	-	46.70	
				7	Imo	39.90	-	
	5	South Eastern	32.00	8	Cross River	-	19.70	-
	6	Rivers	31.60	9	Rivers	-	-	-
Northern Region	7	North Western	31.70	10	Bauchi	-	-	-
				11	Benue	-	-	-
	8	North Central	36.70	12	Borno	-	-	-
	9	Kano	36.20	13	Gongola	-	-	-
				14	Kaduna	39.60	42.90	40.80
	10	Benue Plateau	34.70	15	Kano	53.00	38.20	46.30
	11	North Eastern	32.20	16	Kwara	-	-	40.10
				17	Niger	-	-	-
	12	Kwara	46.10	18	Plateau	-	-	-
				19	Sokoto	-	-	-

Note: - = Not available

Sources: Compiled from: Nigeria: Federal/State Annual budgetary estimates, 1972-78
see also
Pandit, H.N. Growth and changes in allocation pattern of public expenditure on education in Nigeria. Mimeo, Ibadan, Department of Educational Management, University of Ibadan, 1980

areas of study or aspects of the subject like the economic view of education, and the contribution of education to personal income and economic growth.

However, inspite of all these studies, it has not been possible to come up with a precise measure of inputs and outputs of education. Woodhall[8] alerted us to this difficulty when she stated that after more than a decade of research activity it is still not possible to answer some questions in the economics of education. In our view, the consideration of education as an industry necessarily implies that both inputs and outputs be measured in order to be able to rationalise investment strategies in the educational system. The present work will attempt to find means of measuring inputs of education in terms of current expenditure; it will thereby identify factors that influence the cost of education.

The Problem

In Nigeria, there is a growing concern about rapid expansion of educational facilities. This concern is exemplified, for example, by the on-going free secondary education programme in the country. In October 1980, five of the nineteen states of the country, namely, Oyo, Ogun, Ondo, Lagos and Bendel embarked on a free secondary education. There is also, a nationwide plan for secondary education expansion commencing in 1982; this is designed to accomodate the graduates of the nation-wide Universal Primary Education scheme (U.P.E) which was inaugurated in

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[8] Woodhall, M. Economic Aspects of Education, London: National Foundation for Educational Research, 1972, p.16.

1976. Commenting on the impelementation of free junior secondary schools throughout the country in 1982, the Implementation Committee for the National Policy on Education[8] outlined certain constraints which are likely to impede the implementation of the programme. These are shortage of human resources, unequal distribution of secondary school facilities, and a serious financial constraint.

It is generally feared that a high proportion of the educational expenditure on secondary education in the governments' meagre budgets poses a threat to further expansion of other educational facilities, and to the financing of other economic and social projects. This widely held belief is being strengthened by the fact that the funding of education in Nigeria is gradually being shifted to one single source, that is the government. The abolition of tuition fees and the take-over of schools by the government eliminated the private sources of finance. This again, points to the need for a more efficient use of the governments' resources if the expanding system coupled with limited resources is to be achieved. Particular attention is paid to government recurrent expenditure on education; the fluctuation of which may constitute a bottleneck in the implementation of educational programmes.

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[8] Nigeria: The Public Service of Nigeria. Implementation Committee for the National Policy on Education (Blue Print) Lagos, 1979, p.21

The Objectives

The focus of the present study is on the analysis of current cost of secondary education with a view to finding or improving the control of costs through better allocation and management of resources at the school level.

The Nigerian government has been facing a problem of rapid rate of growth in expenditure in the face of declining rate of growth in revenue, thus creating a situation that would encourage increasing deficit financing. This problem has been brought about by sustained inflation of prices in the economy because of the continuing effects of the enhanced oil prices during the boom years of 1973 and 1974. Also, partly because of the upward movement of salaries and wages resulting from the general salary revision of the Udoji Report[9] and the subsequent ones, namely, the Public Service Review Panel in 1975 (William and William)[10]; the 1977 salary award by the Military Head of State (Obasanjo award); and the recent award in 1980 by the President of the country (Shagari award).

On the other hand, the production and sale of petroleum which forms the main source of revenue of the country are declining. It could be expected that this problem might be compounded by the pressing needs of economic development, especially in the other equally important sectors such as agriculture, health, housing and roads. This situation would tend to call for economy in the use of scarce resources available to education. This study would therefore, be relevant in this situation as it may succeed in suggesting useful guidelines for the control of costs at the institutional level.

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[9] Nigeria: The Public Service of Nigeria Udoji Report "Op cit"

[10] Nigeria: The Public Service of Nigeria. Government views on the report of the Public Service Review Commission, (William and William). Lagos, 1975.

[11] Nigeria: The Public Service of Nigeria. Blue Print. "Op Cit" p.7.

The present study will therefore be directed at investigating problems such as: the extent to which unit cost of secondary education varies between institutions; the factors responsible for the variations; and the extent to which policy can influence these factors in order to control unit cost. Moreover, attempt will be made to study the staffing condition as it affects both the economic and pedagogical aspects of education.

Significance of the Study

Educational policy makers and planners know that they can improve their projection of new resources and make a more effective decision on educational projects on the basis of analysis of costs of education. Although it is not advocated that costs and costs alone should direct educational policy and planning, cost analysis, especially unit costs will give a quantified framework within which it is possible to estimate in advance the financial effect of changes due to educational programmes at micro and macro levels.

The present study is very important in terms of application of techniques to the study of costs of education and also in providing bench-mark data on planning norms such as unit cost of education, regional disparities in educational development, allocation of resources by items and factors influencing cost of education. The most important contribution expected from the study is the procedure of analysing the ranges of variation in factors influencing unit cost of education, which can guide planners in taking adequate actions for controlling the rise in costs of education.

Definition of Terms

This study is primarily concerned with factors which determine the growth of cost of secondary education. In this section, an attempt is made to define concepts that will be used in the study in order to provide a basis for the understanding of discussions in the subsequent chapters[12].

Educational Disparity

By educational disparity we refer to a situation within an educational system whereby regions, states or Local Governments do not enjoy the same level of opportunities for educational development. In this view, the concept of equality of opportunity in education is closely linked with the concept of educational disparity.

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[12] For general definitions of terms on cost of education, see:

(a) Blaug, M. An introduction to the economics of education. London, Penguin Books, 1970
(b) Hallak, J. The analysis of educational costs and expenditure. Paris, UNESCO-IIEP, 1965
(c) Vaizey, J. an [illegible] .D. Chesswas Costing Educational Plans. [illegible] NESCO-IIEP, 1967.

Considering equality of opportunity in education in a society, the question is whether enough educational facilities (in form of schools, teachers, funds) are provided in the educational system to allow for: equal access to education; equal participation in educational programmes; and equal achievement in the educational system. It follows therefore that educational disparity is created in an educational system which fails to provide facilities to allow equal access to education, equal participation and equality in achievement in education.

The Cost of Education

By cost of education, we refer to the monetary value of resources used up in the production of human capital during a given period of time. This concept of cost is used here in three ways in relation to three investment decision-making bodies on education, namely: the institution (institutional cost); the household (private cost); and the society (social cost). These three bodies incur costs which together form the total cost of education. Institutional cost consists of capital cost and current cost of education; Private cost is comprised of the money which families, households or any private institution invests in education as well as what the student himself foregoes by being in school; and social cost of education is usually obtained by adjustments in private and institutional costs. This is obtained by adding together institutional and private costs excluding scholarships and fees.

Capital Cost

The concept of capital cost refers to any stock existing at a given time that yields a stream of services over time. The flow of services is derived from the items of capital stock whose value is calculated by capitalising the service flow with appropriate discount rate (depreciation and interest on tied down capital). At the school level, capital cost consists of the school buildings, the land on which the school is sited, equipment, vehicles, audio visual aids, furniture and books. The stock has a long life-span which implies that the value of its usage is spread over a given life span period. Therefore, the used-up capital at a given point in time is computed from the depreciation of the stock and by applying an appropriate rate of interest.

Current Cost

The current cost of education, sometimes referred to as recurrent or operating cost, relate to personnel services and to consumable materials that are consumed within one school academic year and therefore are regularly renewed. Recurrent costs are grouped into two main parts: staff recurrent costs, and non-salary recurrent costs. These can be further divided into either divisible cost item or non-divisible cost item depending upon whether the item is clearly earmarked for different purposes or not. For example, the salaries and allowances paid to administrative and establishment staff of the Ministry of Education are considered as a non-divisible item. The present study is however limited to salaries of teachers at the school level.

Unit Cost

The unit cost of goods or service represents the ratio between the cost (of production, sale or purchase) of a given quality of goods or services and the quantity of such goods or services expressed as a number of units. This concept of unit cost also applies to education; the valuation of the unit cost of the services of education implicitly presupposes that the production of education can be quantified. Unit cost represents the cost of creating or operating a school, a class room, one student year and so on.

Macro and Micro Level cost analysis

Macro level cost analysis has its focus on the analysis of relationship between investment in education and Gross Domestic Product (GDP), and public expenditure on all sectors of a given country. Quite often, the trends in these ratios of GDP and public expenditures in relation to education are used in forecasting supply of resources for the education sector as a whole. Micro level cost analysis on the other hand provides useful link between inputs of educational institutions and their objectives, outputs and benefits. For the purpose of improving internal efficiency of the education system, cost analysis needs to be carried out at this level.

The next chapter of the thesis is devoted to the review of past works in the field of educational cost analysis.

CHAPTER II

REVIEW OF RESEARCH AND OTHER RELEVANT LITERATURE

The present research is based on micro level study in the field of educational cost analysis. Studies at the micro level are relatively few; and infact, research activities in the field of educational cost analysis only began in the 1950s. Woodhall[1] commented on the relatively late development of research activities in this field when she stated that:

> The most obvious area for research by the economist is the whole question of educational costs ... but ... even after more than a decade of research activity .... cost analysis .... remains one of the most fruitful areas of research.

Vaizey[2] conducted one of the pioneering studies on educational cost analysis. He reported a dearth of relevant information on cost of education in Britain at the time which alerted many economists to the need for more works in this field. Reviewing Vaizey's work, Woodhall[3] again expressed the hope that the sophistication of information on costs would be increased particularly by means of detailed studies on institutional costs.

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[1] Woodhall, M. "Op cit" p.16

[2] Vaizey, J. The Cost of Education, London: Allen and Unwin, 1975

[3] Woodhall, M. "Op cit" p. 31

Consequent on the relative slowness of research activity in the field of educational cost analysis, the technique of cost analysis was not effectively applied to educational planning as it has been applied to working process of other industries for many decades. Coombs and Hallak[4] reported the apparent limitation in the application of cost analysis to the educational targets of the 1950s and the 1960s, noting that the educational targets proved unachievable because of inadequate projection of resources required.

However, research activity in this field got a boost in 1968 with the launching of a world wide project on costs of education by the International Institute for Educational Planning (IIEP). The project covered African countries (Ivory Coast, Madagascar, Tanzania, Uganda, Morocco); Latin America (Barbados, Brazil, Chile and Columbia); Asia (Sri Lanka , India, Thailand); Eastern Europe (Hungary, Poland, USSR); and Organisation for Economic Co-operation and Development (Canada, France, Norway and United Kingdom). The 27 case studies prepared in these countries are published in three volumes[5]. This three-volume work has been a useful guide to researches in cost of education. The case studies illustrated major purposes of cost analysis which include:

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[4] Coombs, P.H. and J. Hallak, Managing Educational Costs. Oxford University Press, 1972 p. 5

[5] IIEP, Educational Cost Analysis in Action: Case Studies For Planners. Paris: UNESCO-IIEP, 1972.

checking of economic implications and feasibility of specific policy decision; determination of projects and innovations; weighing the comparative advantages of alternative ways to pursue the same objectives; evaluating and improving the allocation of resources and improving efficiency and productivity. The studies were also directed at three major types of educational situations, namely, countries involved in linear expansion of their educational system, those involved in bringing about modification in their educational system and those trying to bring fundamental changes in their educational structures.

In the last two decades, attempts have been made by scholars to study educational cost analysis; but there appears to be a persistent difficulty in obtaining adequate data on cost of education. Vaizey[6] for instance, reported deficiencies in the data required for analysis. The same way, Cummings[7] experienced similar difficulty when he investigated the cost of the Scottish Local Education Authority (LEA) education. He complained that records of data and information were not available for the analysis of costs of different ways of organising schools, costs of individual subjects within schools or even details of the division of education budget between educational expenditure as such and social welfare items.

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[6] Vaizey, J. Op Cit

[7] Cummings, C.E. Studies in Educational Costs. Scottish Academic Press, 1971.

Inspite of this constraint, many studies have been conducted, the conclusions of which have been useful in guiding policy makers/educational planners throughout the world. An attempt will be made in this chapter to review some of the past studies, highlighting conclusions which are relevant to the present investigation.

The review is presented under the following areas of our investigation:

(a) Factors responsible for disparity in the distribution of schools.

(b) Diagnosis of staffing conditions

(c) Analysis of unit cost

(d) Factor analysis of unit cost, and

(e) Other relevant studies.

Factors Responsible for Disparity in the Distribution of Schools

A number of factors would be adduced to the disparity of schools in a country or in a particular state. Potentially, factors such as population and accessibility are capable of influencing location of schools and hence their overall distribution over a state. Caillods[8] has suggested that when diagnosing the educational development of a state, it is necessary to select indicators on which the analysis will be based and such indicators usually relate to schooling characteristics and with demographic, institutional and environmental (social, economic, geographic) characteristics.

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[8] Caillods, F. The Choice of Statistical Units and Parameters in School Mapping Methodology. (IIEP/Prg. Int. 77.002) Paris, UNESCO-IIEP, 1977, p.4.

Obadan[9] has used a synthetic indicator approach to diagnose the regional disparities in educational facilities for secondary education in Bendel State, with indicators such as population density, transition rate, enrolment rate, the proportion of enrolment in secondary schools to enrolment in primary schools, the number of primary schools per secondary grammar schools, the area served by one secondary school, size of school, student-teacher ratio and the actual expenditure per student. He identified the regions in Bendel State needing improvement of school conditions at secondary level. He reported that a high percentage of unqualified teachers in many parts of the state was responsible for what he described as the "falling standard of education in the state."

In the present investigation, an attempt is being made to look at the problem of secondary educational disparity using the synthetic indicator approach. Some of the indicators used by Obadan (also Caillods, 1980) will be used with modification, keeping in view the specific aims of the present study. These indicators are discussed in chapter four.

Diagnosis of Staffing Conditions

Personnel costs, particularly teacher cost, usually dominate recurrent costs of education. This stems from the fact that education is a labour-intensive industry.

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[9] Obadan, E.M. School Mapping as a Tool for Structural Reform of Secondary Education System, Unpublished M.Ed Project, Department of Educational Management, University of Ibadan, 1978.

Much attention has therefore been given to this factor of cost by scholars wanting to establish the degree of its effect on total expenditure on education; to establish international trends in teacher cost; or to estimate future levels of resource for staff. In Nigeria, Callaway and Musone[10] found that staff salaries in primary schools absorbed as much as 80 percent to 95 percent of total recurrent cost in the period 1952 - 1962. This finding has been supported by the report of Coombs and Hallak[11] that teachers' salaries usually account for between 75 - 90 percent of schools expenditure.

Empirical works have shown that educational cost on staff salaries follow the same general pattern, even though, the salaries of teachers, administrators and other non-teaching staff vary from country to country. For instance, in the U.S.S.R., Basov[12] reported that 75 percent of all state expenditure on primary and general secondary education in 1965 accounted for salaries and wages. In Sri Lanka[13], staff salaries for primary and secondary education in 1968 was 94 percent of recurrent unit cost per student. Also in Morocco, 98 percent of the total recurrent cost represented teachers' salaries in some selected secondary schools in 1967-68[14]. In Thailand[15], 73 percent of the total recurrent cost was reported to represent staff salaries for secondary education in 1964, while in India, Pandit[16] found that 79.8 percent of the recurrent cost of education was incurred on wages and salaries out of which 68.7 percent was incurred on teacher salaries alone. As revealed in the trend of cost of staff salaries in the countries above, staff salaries tend to constitute a high proportion of total costs; and it follows that a slight increase in staff salaries will affect educational costs considerably. In Nigeria for example, the salary increases due to various awards between 1971 and 1980, in particular, the Udoji report, have increased for instance the grade II teachers salary from ₦450 in 1972/73 to ₦1740 in April 1980 (Okedara 1980)[17].

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[10] Callaway A. and A. Musone. *Financing of Education in Nigeria*, Paris: UNESCO-IIEP, 1968, p. 41

[11] Coombs, P.H. and J. Hallak, *Op cit* pp. 109-112

[12] Basov, V.I., "Estimating the Annual Budget Requirements of the Educational System" in *Educational Cost Analysis in Action I* Paris: UNESCO-IIEP, 1972, p. 14

[13] Alles, J. "Costing First and Second-level general education" in *Educational Cost Analysis in Action I*. Paris, UNESCO-IIEP 1972, p. 77.

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14. Proust, J. "Costs of Public Secondary Education - Analysis of the Results of a Government Survey in Educational Cost Analysis in Action III, Paris: UNESCO-IIEP, 1972, p. 227

15. Reiff, H.W. "Thailand-Educational Cost Analysis" Educational Cost Analysis in Action I, Paris: UNESCO-IIEP, 1972 p. 213.

16. Pandit, H.N. Investment in Indian Education: Size, Sources and Effectiveness. Paris: UNESCO-IIEP, Occasional Papers No. 43, 1976.

17. Okedara, J.T. Behaviour of Grade II Teachers Initial and Terminal Salaries in Oyo State of Nigeria, 1971-80 Mimeo, Ibadan, Department of Adult Education, University of Ibadan, 1980.

The importance of teachers' salaries was further stressed by Chesswas[18] when he said that teachers' salaries stand out clearly as one of the major contributors to the rise in recurrent expenditure in education. Investigating the problem of projecting teacher costs in Tanzania, it was found that qualification of teachers and age of teachers are two very important factors in the determination of future bill for teachers. This conclusion is in line with the findings of Hirsch[19], that teachers' salaries was a crucial variable in the determination of total recurrent cost of education.

In relation to non-teacher cost, Chesswas and Hallak[20] identified boarding, double shift system, economies of scale and the age of school as factors influencing non-teacher recurrent cost. It was discovered that unit cost on boarding was high because of unavoidable tasks associated with it, such as maintenance, clearing and transport cost. It was also found that cost savings result from the double shift system because the system increased enrolment and therefore led to an increase in the utilization of facilities, which in turn resulted in cost savings on items more related to fixed capital plant than to the number of students.

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[18] Chesswas, J.D. "Factors Affecting Teachers' Basic Salaries" in Educational Cost Analysis in Action, I, Paris: UNESCO-IIEP, 1972, p. 37

[19] Hirsch, W.Z. Analysis of the Rising Cost of Public Education, Washington: Joint Economic Committee, US Congress, 1959.

[20] Chesswas J. and J. Hallak Behaviour of Non-teacher Recurring Expenditures, Paris: UNESCO-IIEP, 1972.

They reported economies of scale whereby some larger schools had lower unit cost per student on all items than small schools due to spread of fixed costs like administrative costs, non-teacher costs and transport costs. Furthermore, age of school was found to have influence on cost since new schools experienced higher unit cost per student on all items as they incur certain expenditure whether full enrolment is attained or not.

The present study will investigate the staff condition of secondary education in Oyo State. As Chesswas had done, we intend to see the influence of average teachers' salaries on the unit cost of education. In addition to this, this study will look at the general staffing conditions, namely, staff utilization and staffing quality with a view to seeing how staff conditions affect both the economic and pedagogical aspects of secondary education.

Unit Cost

The real costs of education per student appear to have been on the upward swing in most nations. In Nigeria, for instance, Callaway and Musone[21] reported that the cost per primary school pupil rose from ₦7.78 in 1952 to ₦11.46 in 1962, an annual rate of increase of 5.3 percent. They discovered wide differences in the costs of education between the then Northern, Western and Eastern Regions of the country. In relation to to secondary education, the unit cost per student in 1962 was ₦432 in the Western Region as against ₦320 in the Northern Region. In Government secondary schools, unit cost was ₦346 while unit cost in Government assisted schools was ₦148.

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[21] Callaway, A. and A. Musone, Op. cit pp. 50 - 54

In Thailand, Reiff[22] has also reported a rising trend in unit salary costs over the period 1954-64. He found that unit salary costs are higher in rural schools than urban schools due to the former having a lower pupil-teacher ratio (11.1 as against 19.1); and to the fact that urban schools usually have a greater enrolment, so that the fixed number of specialist teachers needed are probably more intensively utilized with corresponding economies of scale. However, in the analysis of the general behaviour of educational cost, he observed that expenditure per pupil is not a reliable indicator of educational efficiency since a decrease in unit cost and a simultaneous increase in wastage rates may well be due to inefficiencies in the educational system. It was therefore suggested that 'cost per graduate' will be a better index of efficiency than 'cost per pupil'.

In the present investigation, unit cost will be studied to observe variations in secondary schools; to observe behaviour of unit cost in relation to factors which at different levels contribute to changes in the total recurrent cost of education. The study will also try to find out the optimum size of a school. Some case studies have been done in different parts of Nigeria which indicates roughly the trend in unit cost in the country. Hough[23] conducted a case study on costs of education by Local Government Areas (LGAS) in Bendel and Ogun States. He reported a wide variety in the unit cost of schools in Abeokuta, Ogun State, ranging from ₦91 to ₦213 per student year. Ogunwale[24] conducted a survey study in six primary schools and four secondary schools in Oyo State in 1979. She reported a unit cost of ₦250.25 in secondary schools and ₦62.99 for the primary schools studied. Also in 1979, Gwani[25] reported a unit cost of ₦100 per student year in primary school in Kaduna while the unit cost of secondary school on the average was ₦282. He found that boarding expenditure in the secondary schools studied forms about 50 percent of unit cost of boarding schools; which on the average was ₦600. We shall come back to the findings of these case studies in Chapter Six to compare our result with these studies.

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[22] Reiff, H.W. "Op cit" pp. 209 - 263.

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[23] Hough, J. Case Study of Cost and Other Statistics for Schools in Bendel and Ogun States of Nigeria. Paris, UNESCO-IIEP, (IIEP/S66/9A), 1980

[24] Ogunwale, A. Unit Cost of Primary and Secondary Education. A Case Study of Selected Schools in Ibadan, Nigeria. Unpublished M. Ed Project, Dept of Educational Management, University of Ibadan, 1979.

[25] Gwani, M. Cost Analysis of Primary and Secondary Education: A Case Study in Kaduna State. Unpublished M. Ed Project, Dept. of Educational Management, University of Ibadan, 1979.

Factor Analysis of Unit Cost of Education

One of the major objectives of studies of costs in schools is to explain differences in unit costs for different establishments, by analysing the determinants of these costs. In the present study, attempt will be made to identify factors which determine the cost of secondary education and the degree of contribution of each of the factors.

Magnussen[26] made a useful contribution in the use of models in planning the extension of compulsory education in Norway. In order to compare the cost of alternative policies with regard to nine-year compulsory education, the Ministry of Education used a mathematical model of total current costs comprising of teachers' wages, salaries and allowances of leave and pension payments, expenditure on housing and transport of students, expenditure on furniture and equipment, wages of non-teaching personnel, purchase of non-durable materials, and maintenance of buildings and durable equipment. The model excludes the capital cost of buildings or large-scale equipment, and also excludes the annual cost of the servicing of this capital, that is, interest payments or deprection. Only maintenance expenditure is included as part of the current costs. He assumed the cost of capital is approximately constant for all the policy variables observed in the model. It was also assumed that the annual cost of capital services was not sensitive to changes in the policy variables, and would vary only significantly from one set of alternatives to another. Thus, for his purpose of comparing the cost implications of alternative policy decisions, the model concentrates simply on current costs. It was found, among other things, that size-distribution of schools through its effect on average class size and the requirement for additional teacher-hours for teaching in divided classes has greater impact on cost, contrary to the general belief that growth in the total number of pupils was the most decisive factor.

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[26] Magnussen, O. "The use of Educational Cost Models in Planning the Extension of Compulsory Education, in Educational Cost Analysis in Action II, Paris: UNESCO-IIEP, 1972, p. 95.

In the present investigation, econometric models will be used to study relationship between unit cost and six factors, to find out the contribution of each of the factors tc unit cost. It will be interesting to see the correlation between this study and that of Magnussen, particularly, in respect to enrolment and class distribution in schools.

Cumings[27] has also used econometric model in the study of the relationship between unit cost of education to the total size of individual schools. He discovered that there was clear evidence of economies of scale for primary schools but not for secondary schools. Likewise,

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27. Cumings, E.E. "Op cit"

Lakadawala and Shah[28] used mathematical model to find out the optimum size of colleges in the Gujara State of India.They reported that out of all the factors affecting unit cost, the size of the college was most significant. The present study is particularly interested in size of schools as it affects unit cost. It will be worthwhile to see how our result will relate to the findings of Magnussen, Cummings and Lakadawala.

Hirsch[29] tested the hypothesis that daily current expenditure for primary and secondary education is a proportion of total enrolment, the percentage of pupils in urban areas, annual salaries of teachers, and the number of principals per 1,000 pupils. As he had reported that teachers salaries was most singificant of all the variables in the determination of total recurrent cost of education. The present investigation will test a similar hypothesis with more and different factors like student-teacher ratio, age of school and the percentage of trained teachers in schools. It will be interesting to find out whether the earlier conclusion of Hirsch will stand.

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28. Lakadawala, D.T. and K.P. Shah, Optimum Utilization of Educational Expenditure in Gujarat. Sadar Patel Institute of Economic and Social Research, Ahmedabad, 1978.

29. Hirsch, W.Z., Analysis of the Rising Cost of Public Education. Joint Economic Committee, U.S. Congress, Washington, 1959.

Major Drawbacks of the Studies

Only a few of the studies discussed so far cover micro level, and in most cases, national budgets are used for the data analysed. In essence, conclusions reached may not give adequate picture of cost at the institutional level. The study of Reiff[30] for example did not show variations at the institutional levels. A survey approach will give a closer picture of the cost of education. In terms of relevance, most of the conclusions are tailored to particular countries, and may not be true of the situation in Nigeria. It is doubtful, for example, that the factors affecting non-teacher salary in Tanzania will affect the non-teacher salaries in Nigeria. It will be recalled here, that apart from Callaway and Musone[31] no other detailed study on cost analysis has been undertaken at the ~~micro~~—level. Although, other useful studies have been done in Nigeria in the field of Economics of Education, for instance, Hinchliffe[32], Briggs[33], and Akangbou[34], these studies were primarily concerned with economic return to education and cost analysis was only incidental in these studies.

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30 Reiff, H.W. "Op cit"

31 Callaway, A. and A. Musone "Op cit"

32 Hinchliffe, K. Educational Planning Techniques for Developing Countries with Special Reference to Ghana and Nigeria. Unpublished M. Phil Thesis, Leicester, University of Leicester, 1967.

33 Briggs, B. Economic Returns to Secondary Education in Nigeria. Unpublished Ph.D. Thesis, London, University of London, 1974.

34. Akangbou, Resource Allocation and Utilization in Nigeria: A Case Study of Mid-Western Nigeria Unpublished D. Phil. Thesis, York, University of York, 1977.

There is a decade of time lag between the cost analysis done by Callaway and Musone 1968[35]. Salaries for example, were much lower at the period of their study. The study which is at macro level, relied mainly on public accounts. There is therefore a great need for cost analysis at micro level in Nigeria in order to have as close as possible estimate of resources needed for educational expansion.

The Present Study

The foregoing section provides the spring-board for the present study: an investigation into factors which determine costs of secondary education. It is expected that the outcome of the study will provide the policy-maker/planner statistical information necessary for a more effective planning.

The study therefore addresses itself to the following major areas of investigation:

(a) Diagnostic analysis of secondary educational development in Oyo State. This is presented in Chapter four of the thesis.

(b) Analysis of enrolment and teaching staff. This is presented in Chapter Five.

(c) Determination of Unit cost of secondary education. This is discussed in Chapter Six, and

(d) Analysis of factors influencing unit cost of education which is presented in Chapter Seven.

In the next chapter, the design and procedure of the study will be discussed.

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[35] Callaway, A. and A. Musone. "Op cit"

CHAPTER III

DESIGN AND PROCEDURE

The present study is organised into three parts, based on the four areas of the investigation discussed in Chapter two, namely: diagnosis of disparities in secondary educational development; analysis of enrolment. teaching staff and unit cost of education; and the analysis of factors influencing variation in unit cost of education.

Diagnostic Analysis of Secondary Educational Development

This analysis is designed to highlight disparities in educational development. A synthetic indicator approach is used with the following indicators:

R_1, R_2, R_3, R_4, R_5, R_6, R_7, R_8, and R_9.

where R_1 = Average number of secondary school student per 1,000 population

R_2 = Average population served by one secondary school

R_3 = Average radius per catchment area per secondary school

R_4 = Average number of primary schools per secondary school

R_5 = Percentage of enrolment in secondary schools to enrolment in primary schools

R_6 = Educational expenditure allocation per head of population

R_7 = Student-teacher ratio

R_8 = Average size of secondary school

R_9 = Unit cost per student year.

The data for these indicators were collected for each of the 24 Local Government Areas (LGAs) of the state. These data were processed by the computer and the computer results were scaled and weighted. The LGAs were then ranked according to the conditions of secondary schooling as the indicators have revealed (see Chapter four).

Analysis of Enrolment, Teachers, and Unit Cost

The analysis in this section is based on models evolved to find out educational cost norms for purpose of cost control, future projection of resources and maximal utilization of resources. Such norms include: average salary, average class size, student-teacher ratio and optimum size of school. The size-cost relationship model given below is expected to show optimum size of secondary school in Oyo State.

$$Y = \alpha + \beta_1 E + \beta_2 E^2$$

where Y = Unit cost

α = Constant

β_1, β_2 = Co-efficients

E = Enrolment

This model is a quadratic mathematical relationship between size (enrolment) and unit cost of education at secondary school level. The model is tried on a sample of 60 schools selected from the 24 LGAs of Oyo State, and also on each of the three categories of schools in the State, viz. grade I, grade II and grade III schools.

Analysis of Factors Influencing Variations in Unit Cost

This section aims at establishing functional relationship between unit cost and factors which influence cost of education. The least squares method is used to estimate co-efficients of the multiple regression model to find out significance of each factor in relation to variations in unit cost of education in the selected secondary schools.

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6$$

Where Y = Unit cost

α = Constant

$\beta_1, \beta_2 \cdots \beta_6$ = Co-efficients

X_1 = Age of school

X_2 = size of school

X_3 = Average class size

X_4 = Student-teacher ratio

X_5 = Percentage of trained teachers

X_6 = Average salary per teacher.

Regressions

The analysis of the relationship between unit cost and age, size, class size, student-teacher ratio, percentage of trained teachers, and average teacher's salary is done by using linear and step-wise regressions. This is to determine the linear dependence of the dependent variable on the determinant variables. In other words, the contributions of the determinant variables to unit cost.

Sampling Scheme

A stratified probability proportional to size (PPS) with replacement scheme was used; the strata being Local Government Areas (LGAs) and size being the enrolment figures.

In the 1978/79 academic year, there were 236 secondary schools in Oyo State, spread over 24 LGAS. A sample of 60 schools were fixed in advance, and these were allocated to each LGA in proportion to the number of schools in the LGA on the basis of the following formula :

$$S = \frac{L}{0} \times M$$

where S = number of sample from LGA

L = number of schools in LGA

O = Total number of schools in Oyo State, 1978/79

M = Maximum number of schools to be studied.

In the case of Oranmiyan LGA for instance, there were 28 secondary schools in the 1978/79 session out of the 236 secondary schools in Oyo State. On the basis of the above formula, we choose 7 secondary schools i.e.

$$\frac{28}{236} \times \frac{60}{1} = 7.$$

The PPS with replacement scheme was used for selection in each LGA. In LGA 22 for example, there were 28 schools. The enrolment figures were cumulated, and the total number were 12703. Since we need to select 8 schools from 28, we choose 8 random numbers from 00001 to 12703. Table 3.1 presents the number of schools selected in each of the LGAs.

Research Instruments

A comprehensive six-part questionnaire is used for the study. (see Appendix A). The components are as follows: Identification of school; Enrolment analysis; Teachers and non-teaching staff cost; Equipment and school facilities costs (consumables only); and Costs of school buildings (maintenances expenditure only).

(a) School Identification: This part of the instrument is designed to collect data about school location, the management, sex served by school (whether all boys, all girls or mixed schools), the number of classes in the school and the number of classrooms in the school.

Table 3.1

Number of Schools Selected for study in each of the 24 LGAs in Oyo State

Serial No.	LGA	Total No. of School	No. Selected
1.	Akinyele	6	2
2.	Atakumosa	6	2
3.	Ede	7	2
4.	Ejigbo	5	1
5.	Ibadan	34	8
6.	Ibarapa	7	2
7.	Ifedapo	5	1
8.	Ifelodun	9	2
9.	Ila	5	1
10.	Ilesha	14	3
11.	Irepo	3	1
12.	Irepodun	2	1
13.	Irewole	11	3
14.	Iseyin	8	2
15.	Iwo	9	2
16.	Kajola	6	2
17.	Lagelu	4	1
18.	Obokun	18	4
19.	Odo-Otin	7	2
20.	Ogbomosho	12	3
21.	Oluyole	10	2
22.	Oranmiyan	28	7
23.	Oshogbo	7	2
24.	Oyo	13	3
	ALL LGA	236	60

(b) Enrolment Analysis: This is designed to find out the enrolment of the schools according to sex, class wise and the total enrolment. A section of the questionnaire investigates the enrolment history of the school, that is, fresh entrants, the number of transfers in, transfers out, repeaters, drop outs and students promoted.

(c) Teachers and non-teaching Costs: This part of the instrument is designed to inquire about the total number of teachers, distribution of staff as to sex, functions, qualification/training, salary grade, annual salary and allowances.

(d) School Equipment Costs: This questionnaire is to inquite about the cost of text books and stationery, teaching aids, equipments, school materials, and games equipment.

(e) Cost of School Buildings: This part of the questionnaire is designed to collect data on cost of school buildings and maintenance of the buildings.

(f) Individual Questionnaire for Teachers: This is included in the questionnaires to collect detail data on individual teachers as to age, qualification, experience, salary and allowances and so on.

Other Sources of Data

Data for analysis of disparities in secondary educational development, like, population, size of schools and recurrent expenditure by LGAs are collected from the original records of the Ministry of Education and from the Central Schools Board, Oyo State. The Survey Department of the Ministry of Lands and Housing supplied data on areas covered by each of the LGAs.

Validation of Research Instruments

In establishing the content validity of the present research instrument, the specific objectives of the investigation were closely related to the items on the questionnaire. This was further supported by face validity. The questionnaire was submitted for review to a specialist in Economics of Education, two Senior Lecturers in the Department of Statistics, and one Senior Lecturer from the International Centre for Educational Evaluation, all of the University of Ibadan. On the basis of their comments, ten of the items on the questionnaire were revised.

In a pilot study, the questionnaire was administered to five school principals in Ibadan who were not involved in the main study. Two months later, the questionnaire was administered to the same principals. A test-retest reliability of 0.72 was obtained. The internal consistency of the questionnaire is reflected in the mean item - whole correlation figure given above.

Data Collection

The field work was spread over the 1979/80 academic year. First, visits were paid to the Ministry of

Education, Oyo State to collect data on all institutions in the state. This group of data was used for diagnosis of secondary educational development in the state. Later on, visits were paid to each of the 60 selected secondary schools to discuss with the Principals and the Bursars about the purpose of the questionnaires and how they should be filled. As the questionnaires could not be completed on one visit, we allowed one week before our second visit to each of the schools for the collection of the questionnaires.

Method of Analysis

For the first part of the analysis, a synthetic indicator approach was used to diagnose disparities in secondary educational development in Oyo State (Chapter IV). In the subsequent analysis, mathematical and econometric equations were used to find out cost norms such as unit cost of education, average salary, student-teacher ratio, average class size and optimum size of school (Chapters V and VI). Furthermore, quadratic models were used to study size-cost relationship. Linear and multiple regressions were also employed to study factors influencing unit cost of education (Chapter VII).

CHAPTER IV

SECONDARY EDUCATION IN OYO STATE: PROGRESS AND DISPARITIES

Before proceeding to the analysis of progress and disparities in secondary education in Oyo State, it is pertinent to discuss briefly the historical background of the State and the status of its secondary educational development in relation to the other states of Nigeria.

Oyo State is one of the nineteen states of Nigeria. It came into existence in 1976 when what was then the Western State was split up into three states, viz., Ondo, Ogun and Oyo. The western state itself had previously come into existence in 1967 when the country was divided into twelve states by the then Federal Military Government. According to the latest estimates of population by states by the Federal Ministry of Planning, the population of the State in 1979 was 7.5 million. The total geographical area is 46,862 km^2 (see Appendix D). This gives a man to land ratio of 175 persons per km^2 in 1979 for the state as a whole. Fig. 4.1 presents the political structure of Nigeria showing the 19 states.

Regarding development of secondary education, 10.4 percent of the total enrolment in the whole country is located in Oyo State. Tables 4.1 and 4.2 give the position of secondary education in Oyo State in relation to the 19 states of Nigeria. Table 4.1 presents the distribution of enrolment in secondary schools during 1976/77 by States. Enrolment in secondary schools in

Oyo State during this period was 76.9 thousand, the fourth highest enrolment figure in the country. In the absence of detailed data on age distribution of school population, Table 4.2 gives enrolment-participation ratio for every 10,000 population in each state. It is observed from Column 2, of Table 4.2 that the Oyo State position comes down considerably in relation to the other states in the country. It ranks 9th on the basis of enrolment-participation ratio.

When the tables are studied together, it is clear that Oyo State ranks high (4th) on the basis of aggregate enrolment but comes down to 9th position when enrolment is studied in relation to population-size of each state.

Progress of Education in Oyo State

The educational system of the state comprises of free and fee paying primary schools, secondary (modern and grammar) schools, teacher training and technical college. There is also one college of education, one college of arts and science, one polytechnic and a few schools for handicapped children. The two Universities in the state are run by the Federal Government. It may be pointed out that, as a result of fast expansion in primary education in the state, the average radius of the catchment areas per school has declined from 2.6 km in 1975/76 to 2.4 km in 1978/79. Up to the academic year 1979/80, all the secondary grammar schools admitted their students into class one through the common entrance examinations conducted by the Ministry of Education. However, under the present arrangement for the current

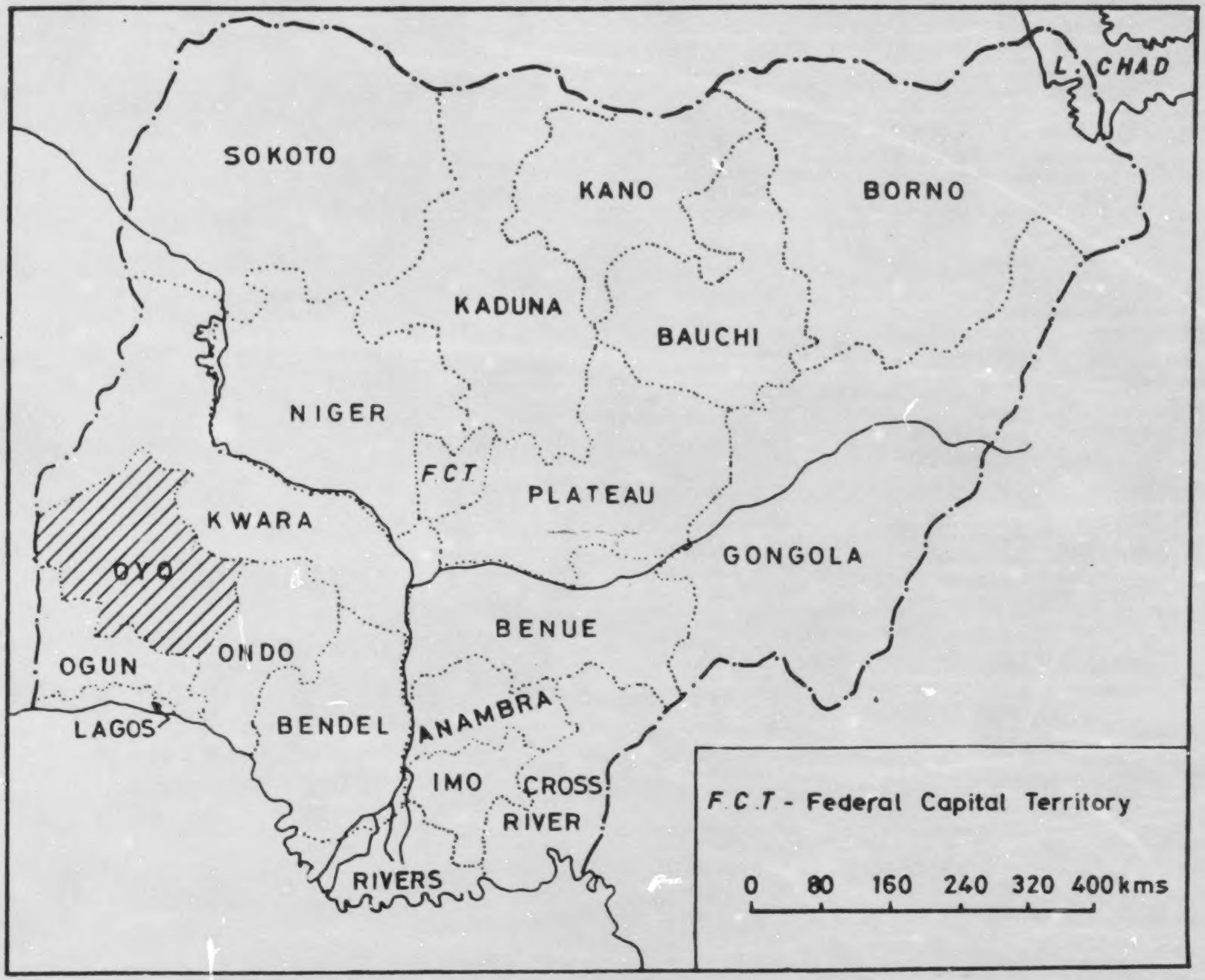

L. CHAD
SOKOTO
KANO
BORNO
KADUNA
BAUCHI
NIGER
F.C.T.
PLATEAU
KWARA
OYO
GONGOLA
BENUE
OGUN
ONDO
LAGOS
BENDEL
ANAMBRA
IMO
CROSS RIVER
RIVERS
F.C.T - Federal Capital Territory
0 80 160 240 320 400kms

Fig. 4·1: The federal Republic of Nigeria showing Oyo State

Table 4.1

Distribution of Enrolment in Secondary Education in Nigeria by States, 1976/77

Serial No.	State	Enrolment (in 000s)	Percentage Total
1	Imo	107.4	14.6
2	Bendel	95.3	13.0
3	Anambra	80.3	10.9
4	Oyo	76.9	10.4
5	Lagos	73.3	10.0
6	Cross River	50.4	6.8
7	Ondo	49.5	6.7
8	Rivers	39.2	5.3
9	Ogun	33.7	4.5
10	Kwara	31.6	4.3
11	Kaduna	22.5	3.1
12	Benue	21.3	3.0
13	Plateau	13.1	1.8
14	Kano	10.1	1.0
15	Gongola	8.0	1.1
16	Borno	7.6	0.9
17	Sokoto	6.6	0.9
18	Niger	4.9	0.7
19	Bauchi	4.7	0.6
	NIGERIA	735.9	100.0

Source: Federal Republic of Nigeria: *Implementation Committee for the National Policy on Education* (Blue Print) 1978-79, Lagos, 1979 p. 64.

Table 4.2

Number of Secondary School students per 10,000 population by States of Nigeria, 1976-77

Serial No.	State	No. of Student per 10,000 population
0	1	2
1	Lagos	337.2
2	Bendel	232.2
3	Imo	213.0
4	Rivers	165.2
5	Anambra	162.8
6	Ogun	157.0
7	Kwara	134.4
8	Ondo	132.0
9	Oyo	107.5
10	Cross River	105.4
11	Benue	67.1
12	Plateau	46.9
13	Kaduna	40.1
14	Niger	30.0
15	Gongola	22.6
16	Borno	15.9
17	Bauchi	14.1
18	Kano	12.7
19	Sokoto	10.5
20	NIGERIA	96.1

Source: Ibid.

year 1980/81, students are expected to be placed in a secondary school in their neighbourhood, without entrance examination, at the successful conclusion of the sixth year of primary school.

The overall growth of enrolment by types of institutions is shown in Table 4.3. It is observed from Table 4.3 that total enrolment increased from 718.9 thousand in 1975/76 to 950.9 thousands in 1978/79, an increase of 232 thousand during the three year period. On an average, enrolment rose by 77.3 thousand per annum. In other words, there was 32.3 percent increase during the period. Enrolment in different types of institutions increased at different rates. The highest increase in enrolment during the period (71 percent) was registered with respect to secondary grammar schools. It was followed by enrolment in handicapped schools. There was 33.2 percent increase in enrolment in primary schools and 23 percent increase in fee-paying schools. In fact, enrolment in secondary modern schools and technical colleges declined by 24.3 per cent and 38.9 percent respectively. These patterns of growth in enrolment in the state as a whole may be noted. Table 4.4 gives the growth in the stock of teaching manpower by types of institutions during 1975/76 to 1978/79. It is seen that total stock of teaching manpower increased from 23.9 thousand to 34 thousand during the period, an increase of 10.1 thousand. In other words, teaching manpower increased by 3.3 thousand per annum.

Table 4.3

Enrolment in Educational Institutions by Type in Oyo State 1975/76 - 1978/79

Serial No.	Type of Institution	1975/76	1976/77	1977/78	1978/79	Index of change between 1975/76 & 1978/79 1975/76 = 100
1	Fee-paying primary	12,060	12,533	13,239	14,845	123.1
2	Free primary	582,452	686,734	722,894	775,552	133.2
3	Secondary modern	47,882	45,171	36,312	36,284	75.7
4	Secondary grammar	65,405	76,886	91,274	112,153	171.5
5	Teacher training colleges	6,539	7,091	7,992	8,129	124.3
6	Technical colleges	1,973	1,933	1,647	1,205	61.1
7	Poly-technic	2,415	3,012	2,655	2,425	100.4
8	Schools for handi-capped	130	243	318	296	164.4
9	All States	718,906	833,603	876,331	950,889	132.3

Source: Nigeria, Oyo State. Annual Digest of Educational Statistics, Ibadan, 1975-1979.

Table 4.4

Number of Teachers in Educational Institutions in Oyo State 1975/76-1978/79

Serial No.	Type of Schools	1975/76	1976/77	1977/78	1978/79	Index of change between 1975/76 & 1978/79 1975/76 = 100
0	1	2	3	4	5	6
1	Free-Primary Schools	18,913	22,823	24,937	27,594	145.9
2	Fee-paying primary schools	419	412	416	-	-
3	Secondary modern	1,663	1,670	1,433	1,494	89.8
4	Secondary grammar	2,395	2,816	3,625	4,438	185.3
5	Teacher training colleges	270	310	349	400	148.1
6	Technical Colleges	75	61	65	87	116.0
7	Polytechnic	153	165	170	-	-
8	Schools for the handicapped	18	22	26	-	-
9	All States	23,906	28,279	31,021	34,013	142.3

Source: Ibid.

Table 4.5

Student-Teacher Ratio in Educational Institutions by Type in Oyo State 1975/76 - 1978/79

Serial No.	Type of Institutions	1975/76	1976/77	1977/78	1978/79	Index of change between 1975/76 & 1978/79 1975/76 = 100
0	1	2	3	4	5	6
1	Fee-paying primary	29	30	32	-	-
2	Free primary	31	30	29	28	91
3	Secondary modern	29	27	25	24	84
4	Secondary grammar	27	27	25	25	93
5	Teacher training colleges	24	23	23	20	84
6	Technical colleges	26	32	25	14	53
7	Polytechnic	16	18	16	-	-
8	Schools for handicapped	10	11	12	-	-
9	All State	24	25	23	22	81

Sources: Ibid.

When Tables 4.3 and 4.4 are studied together, it is observed that there is an average growth rate of teaching manpower of (42.3 percent) as against 32.3 percent increase in enrolment. It is also seen that teacher ratios by types of institutions have changed during the period 1975-76 to 1978-79. Actual changes in student-teacher ratios may be seen from Table 4.5. It is observed from the table that the student-teacher ratio declined by 47 percent in technical colleges, 16 percent in teacher training colleges and 7 percent in secondary grammar schools. On the whole, student-teacher ratios declined from 24 to 22 during the period covered in the table.

Disparities in Educational Facilities

In this Chapter, the primary objective is to study and analyse disparities in the growth patterns of educational development by local governments measured in terms of the following:

- access to education
- quality of education
- efficiency of education
- unit cost of education

A further listing of indicators and the method of analysis are discussed in the sequel.

In diagnosing educational development of a state by Local Government, it is imperative to select appropriate and relevant indicators relating to demographic, geographical, institutional and environmental (social, economic, geographic) characteristics. In this connection, an indicator may be defined as a tool of analysis to reveal inbalances with respect to given characteristics or combinations thereof. In the final analysis, a synthesis of the indicators is expected to indicate the nature and urgency of decisions to be made in order to improve the conditions of schooling in each Local Government area.

The choice of an indicator always depends upon the objective of analysis, stage of education and geographical area under consideration. For example, indicators like enrolment ratios, average population served by school, may provide information regarding the access to education, while promotion, repetition or dropout rates, average school/class size, etc may indicate the efficiency of the individual institutions. Teacher-pupil ratio may reflect quality of teaching-learning conditions. However, it is sometimes argued that unit costs data provide a synthetic indicator of the schooling conditions: such data include teachers' salaries, and other personnel, maintenance, and other facilities in relation to enrolment in different areas. Keeping this in view, we plan to select a large number of indicators and combine them into a synthetic indicator, and to compare this with the unit cost index for diagnosing education disparities.

At this stage, it may be necessary to mention that while preparing synthetic indicators, various parameters or indicators will be combined ~~together~~ by using an appropriate scaling method. The following indicators have been selected for our analysis.

a. Access to Education Indicators

- Average number of secondary school students per 1000 population (R_1)
- Average population served by one secondary school (R_2)
- Average radius per catchment area per secondary school (R_3)
- Average number of primary schools per secondary school (R_4)
- Percentage of enrolment in secondary schools to enrolment in primary schools (R_5)
- Educational expenditure allocation per head of population (R_6).

b. Quality Indicators

- Student-teacher ratio (R_7)

c. Efficiency Indicators

- Average size of secondary school (R_8)

d. Partial Synthetic Indicators

- Unit cost per student year (R_9)

Each of these indicators are analysed separately and towards the end of the chapter, a synthetis of indicators R_1 to R_8 will be presented and used in the classification of Local Governments. This classification will be used to group different Local Governments according to their stages of educational development. Unit cost (R_9) will also be used for similar classification purposes and an attempt will be made to demonstrate if it can be used for purposes of diagnosis of efficiency and quality of education.

(i) Access to Education

Participation Rate (R_1): This is measured in terms of the nunber of secondary school students per 1,000 population in a given Local Government Area (LGA). The indication (R_1) for a given LGA is computed with the help of the following formula:

$$R_1 = \frac{S_2}{p} \quad \ldots\ldots. (1)$$

where S_2 = total enrolment in secondary school and

p = Population.

Table 4.6 gives the participation rate for different Local Governments. It is observed from the table that the participation rate varies from 5 in Irepo to 30 in Oluyole. Individual ranking of the Local Governments may be seen from Column 6 on the table. Local Governments have been arranged in descending order of the magnitude of the participation rate.

(ii) Average Population Served by one Secondary School (R_2)

It is the second important indicator of access to secondary education. R_2 has been computed by using the following formula:

Table 4.6

Average Number of Secondary School Students per 1000 Population by LGAs 1978/79 (R1)

Serial No.	Name of Local Governments	Urban -Centres	Population (in 000's)	Enrolment (in 000's)	No. of students per 1000 population	Rank
0	1	2	3	4	5	6
1	Oluyole	Idi-Ayunre	154.1	4.7	30	1
2	Obokun	Ijebu-Jesa	250.5	6.8	27	2
3	Ibadan	Ibadan	885.9	22.4	25	3.5
4	Oranmiyan	Ile-Ife	513.9	12.7	25	3.5
5	Ilesa	Ilesa	234.1	7.8	23	4
6	Oyo	Oyo	435.3	6.7	15	7
7	Ifelodun	Ikirun	298.7	4.4	15	7
8	Ibarapa	Eruwa	165.1	2.5	15	7
9	Osogbo	Osogbo	353.4	4.6	13	9.5
10	Ejigbo	Ejigbo	158.6	2.0	13	9.5
11	Irewole	Ikire	383.5	4.7	12	12.5
12	Ede	Ede	257.8	3.1	12	12.5
13	Ifedapo	Saki	197.1	2.3	12	12.5
14	Atakunmosa	Osu	195.5	2.4	12	12.5
15	Iseyin	Iseyin	232.3	2.7	11	14
16	Ila	Ila-Orangun	217.1	2.1	10	16.5
17	Kajola	Okeho	160.8	1.6	10	16.5
18	Ogbomosho	Ogbomosho	484.7	4.6	9	19
19	Akinyele	Moniya	262.6	2.3	9	19
20	Odo-Otin	Okuku	250.8	2.3	9	19
21	Iwo	Iwo	475.6	3.6	8	20
22	Lagelu	Iyana Ofa	309.5	2.0	7	21
23	Irepo	Kisi	224.5	1.2	5	23.5
24	Irepodun	Ilobu	220.7	1.2	5	23.5
25	All State		7322.1	110.7	13.8	

$$R_2 = \frac{P}{H_2} \quad .... (2)$$

where P = Population of a given LGA

H_2 = Number of secondary schools in a given LGA.

It is observed from Table 4.7 that the secondary education facilities vary considerably from Local Government to Local Government. On the average, it is seen that 31,027 persons have one secondary school for the state as a whole. With respect to different Local Governments, the number of persons per secondary school varies from the lowest of 13.9 thousand in Obokun to the highest of 77.4 thousand in Lagelu.

(iii) Average Radius per Catchment Area per Secondary School (R_3)

The catchment areas may be defined as the geographical area which a school serves. In other words, it is a well defined area around a school from where it draws its students population. Theoretically, a catchment area will depend on minimum distance from school, density of population and size of school. Again, the catchment area is represented by a circle with radius equal to the maximum distance from home to school. The following formula gives average radius per secondary school in a given Local Government Area

Table 4.7

Average Population Served by one Secondary School per LGA 1978/79 (R2)

Serial No.	Name of Local Governments	No. of Secondary Schools	Population (in 000's)	Population per Sec. School (in 000's)	Rank
0	1	2	3	4	5
1	Obokun	18	250.5	13.9	1
2	Oluyole	10	154.1	15.4	2
3	Ilesa	14	234.1	16.7	3
4	Oranmiyan	28	513.9	18.4	4
5	Ibarapa	7	165.1	23.6	5
6	Ibadan	34	885.9	16.1	6
7	Kajola	6	160.8	26.8	7
8	Iseyin	8	232.3	29.0	8
9	Atakunmosa	6	195.5	32.6	9
10	Ifelodun	9	298.7	33.2	10
11	Oyo	13	435.3	33.5	11
12	Irewole	11	383.5	34.9	12
13	Odo-Otin	7	250.8	35.8	13
14	Ede	7	257.8	36.8	14
15	Ifedapo	5	197.1	39.4	15
16	Ejigbo	4	158.6	39.6	16
17	Ogbomosho	12	484.7	40.4	17
18	Ila	5	217.1	43.4	18
19	Akinyele	6	262.6	43.8	19
20	Osogbo	7	353.4	50.5	20
21	Iwo	9	475.6	52.8	21
22	Irepodun	3	220.7	73.6	22
23	Irepo	3	224.5	74.8	23
24	Lagelu	4	309.5	77.4	24
25	All State	236	7322.1	31.0	

$$R_3 = \sqrt{\frac{A}{S\pi}}$$

where A = the area of the local government

S = the number of the secondary schools.

The value of π = 3.142.

Table 4.8 gives population density and average radius per secondary school. It is observed from the table that density varies considerably from local government to local government. It ranges from 12 in Ifedapo to 1,829 persons in Ilesa. Similarly, average radius per secondary school varies from 2 in Ilesha to 32 in Ifedapo. Column 7 gives ranking of different LGAs.

(iv) Average Number of Primary Schools per Secondary Schools (R_4)

The index of average number of primary schools per secondary school is computed by the following formula:

$$R_4 = \frac{H_1}{H_2} \quad \ldots\ldots\ldots (4)$$

where,

H_1 = Number of primary schools

H_2 = Number of secondary schools.

Table 4.9 gives number of feeder primary schools per secondary school in different LGAs of the state. It indicates to what extent secondary education facilities are a bottle-neck, or facilitate expansion of primary education. From column 4 of the table, it is observed

Table 4.8

Average Radious per Catchment Area per Secondary School by LGAs 1978/79 (R_3)

Serial No.	Name of Local Government Areas	Total Area (km^2)	Density	No. of Secondary Schools	Area per School (km^2)	Radius (km^2)	Rank
0	1	2	3	4	5	6	7
1	Ilesa	128	1829	14	9	2	1
2	Ibadan	877	1010	34	26	3	2
3	Osogbo	356	993	7	51	4	3
4	Ifelodun	828	361	9	92	5	4
5	Oranmiyan	4,742	108	28	169	7	7
6	Odo Otin	1,198	209	7	171	7	7
7	Obokun	2,399	104	18	133	7	7
8	Ede	1,485	174	7	212	8	8.5
9	Irepodun	544	406	3	181	8	8.5
10	Iwo	2,234	212	9	248	9	12
11	Lagelu	1,074	288	4	269	9	12
12	Ila	1,233	176	5	247	9	12
13	Ejigbo	920	172	4	230	9	12
14	Oluyole	2,418	64	10	242	9	12
15	Ogbomoso	3,718	130	12	310	10	15.5
16	Irewole	3,493	110	11	317	11	15.5
17	Atakunmosa	2,418	81	6	403	11	16
18	Akinyele	5,595	47	6	933	14	17
19	Ibarapa	5,945	28	7	849	16	18
20	Oyo	12,368	35	13	951	17	20.5
21	Iseyin	7,196	32	8	900	17	20.5
22	Kajola	7,992	20	6	1,332	20	22
23	Irepo	7,184	31	3	2,395	28	23
24	Ifedapo	16,024	12	5	3,025	32	24
25	All State	92,370	6632	236	391	11	

Table 4.9

Average Number of Primary School per Secondary School by LGAs 1978/79 (R_4)

Name of LGAs	No. of primary schools	No. of secondary schools	Average No. of primary to sec. schools	Rank
1	2	3	4	5
Ilesa	39	14	2.8	1
Obokun	103	18	5.7	2
Odo-Otin	42	7	6.0	3
Osogbo	43	7	6.1	4
Ifelodun	56	9	6.2	5
Ila	32	5	6.4	6
Irepodun	23	3	7.7	7
Ede	57	7	8.1	8
Iseyin	66	8	8.3	9
Ibadan	284	34	8.4	10
Kajola	52	6	8.7	11
Oranmiyan	257	28	9.2	12
Ifedapo	49	5	9.8	13
Iwo	93	9	10.3	14
Ejigbo	43	4	10.8	15
Irepo	33	3	11.0	16
Ogbomoso	154	12	12.8	17
Irewole	148	11	13.5	18
Oluyole	137	10	13.7	19
Ibarapa	101	7	14.4	20
Oyo	202	13	15.5	21
Atakunmosa	102	6	17.0	22
Akinyele	146	6	24.	23
Lagelu	123	4	30.8	24
All State	2,385	236	10.1	

that the number of primary schools per secondary school is 30.8 in Lagelu whereas in Ilesha there is one secondary school for 2.8 primary schools. Disparities between different LGAs may be seen from column 4.

(v) Percentage of Enrolment in Secondary Schools to Enrolment in Primary Schools (R_5)

The index (R_5) has been computed for each LGA with the following formula:

$$R_5 = \frac{S_2}{S_1} \times 100 \quad .... (5)$$

where,

S_2 = Enrolment in secondary schools

S_1 = Enrolment in primary schools.

Table 4.10 gives the percentage of enrolment in secondary schools in relation to the enrolment in primary schools by LGAs. It is observed that the percentage varies from 5.3 in Akinyele to 25.2 in Ilesa. There are wide variations in terms of expansion of secondary education in relation to the development of primary education in different LGAs.

(vi) Educational Expenditure per Head of Population

The index (R_6) has been calculated by using the following formula:

Table 4.10

Percentage of Enrolment in Secondary Schools to Enrolment in Primary Schools by LGAs 1978/79 (R_5)

Serial No.	Name of LGAs	Primary enrolment (in 000's)	Secondary enrolment (in 000's)	Percentage of col.3 to col.2	Rank
0	1	2	3	4	5
1	Ilesa	30.8	7.8	25.2	1
2	Irepodun	6.5	1.2	18.4	2
3	Obokun	37.8	6.8	18.0	3
4	Osogbo	26.5	4.6	17.4	4
5	Ifelodun	25.9	4.4	16.9	5
6	Ibarapa	15.7	2.5	15.9	6
7	Oluyole	29.8	4.7	15.8	7
8	Ila	14.0	2.1	15.0	8
9	Ede	22.3	3.1	14.1	9
10	Ejigbo	14.7	2.0	13.6	10
11	Odo-Otin	18.6	2.3	12.5	11
12	Oranmiyan	112.3	12.7	11.3	12
13	Irepo	11.0	1.2	10.9	13
14	Ifedapo	21.5	2.3	10.7	14
15	Iseyin	25.4	2.7	10.6	15
16	Ibadan	219.1	22.4	10.2	16
17	Oyo	67.2	6.7	9.9	17
18	Ogbomoso	50.7	4.6	9.0	18
19	Kajola	18.9	1.6	8.5	19
20	Irewole	58.9	4.7	7.9	20
21	Iwo	45.9	3.6	7.7	21
22	Atakunmosa	37.4	2.4	6.4	22
23	Lagelu	32.6	2.0	6.1	23
24	Akinyele	42.9	2.3	5.4	24
25	All State	986.4	110.7	11.1	300

$$R_6 = \frac{C_1 + C_2 + C_3}{P} \quad \ldots\ldots (6)$$

where,

P = Population

C_1 = Salaries of teaching and non-teaching staff

C_2 = Allowances of teaching and non-teaching staff

C_3 = Other current expenditures

Table 4.11 gives allocation of expenditure on education per head of population in different LGAs. In terms of distribution of resources represented by this indicator, it shows that different LGAs do not share equal benefits of educational expenditure allocation. It is observed that Irepo had only ₦0.80 allocation as against 7.36 Naira per person in Obokun LGA. With respect to other LGAs, variations may be seen from the table.

Quality of Education

(vii) Student-Teacher Ratio (R_7)

The index of student/teacher ratio for each LGA has been computed by the following formula:

$$R_7 = \frac{S_2}{T} \quad \ldots\ldots\ldots (7)$$

where,

S_2 = Total enrolment in secondary schools

T = Total number of teachers in secondary schools.

Table 4.11

Educational Expenditure per Head of Population by LGAs 1978/79 (R_6)

Serial No.	Name of LGAs	Total population (in 000's)	Total budget (in 000's) ₦	Col. 3 ÷ Col. 2 ₦	Rank
0	1	2	3	4	5
1	Oranmiyan	250.5	1,172.40	4.68	1
2	Ilesa	885.9	4,888.00	5.52	2
3	Ibadan	513.9	3,480.61	6.77	3
4	Obokun	234.1	1,512.30	6.46	4
5	Oluycle	154.1	685.27	4.45	5
6	Oyo	435.3	1,314.43	3.02	6
7	Ibarapa	165.1	480.96	2.91	7
8	Osogbo	353.4	915.81	2.59	8
9	Ifelodun	298.7	652.32	2.18	9
10	Ede	257.8	569.26	2.10	10
11	Ifedapo	197.1	404.94	2.05	11
12	Iseyin	232.3	461.41	1.99	12
13	Irewole	383.5	745.81	1.94	13
14	Ejigbo	158.6	275.81	1.74	14
15	Ogbomoso	484.7	837.62	1.73	15
16	Kajola	160.8	267.66	1.66	16
17	Atakunmosa	195.5	313.03	1.60	17
18	Ila	217.1	327.72	1.51	18
19	Akinyele	262.6	388.18	1.48	19
20	Iwo	475.6	684.02	1.44	20
21	Odo-Otin	250.8	393.89	1.57	21
22	Irepodun	220.7	216.47	0.98	22
23	Lagelu	309.5	296.07	0.96	23
24	Irepo	224.5	195.90	0.80	24
25	All State	7,322.1	21,478.95	2.93	

The indicator represents number of students per teacher in different secondary schools by LGAs. It is used to reflect the quality of teaching-learning conditions in different areas. It is observed from Table 4.12 that the average number of student per teacher varies from 21 in Oyo LGA to 41 in Irepodun LGA. Ranking of different LGA is given in column 5 of the table.

Efficiency of Education

(viii) Average Size of Secondary School (R_8)

One of the factors affecting the unit cost of education is the size of an educational institution measured in terms of enrolment of student. This aspect infact is taken for detailed study subsequently. The average size of a secondary school for each LGA has been calculated by using the following formula:

$$R_8 = \frac{S_2}{H_2} \quad ....(8)$$

where,

S_2 = Total enrolment in secondary schools

H_2 = Total number of secondary schools.

Table 4.13 gives average size of secondary schools by LGAs. It is seen from the table that Kajola LGA has secondary schools of 265 average size as against 659 in Ibadan LGA. Column 5 gives a detailed picture of the variation in the average size of school in different LGAs.

Table 4.12

Average Student-Teacher Ratio in Secondary Schools by LGA's 1978/79 (R_7)

Serial No.	Name of LGAs	No. of Students	No. of Teachers	Student/Teacher ratio	Rank
	1	2	3	4	5
1	Oyo	6,675	317	21	1
2	Ifelodun	4,380	188	23	2
3	Ibadan	22,416	938	24	4.5
4	Obokun	6,802	284	24	4.5
5	Iseyin	2,655	111	24	4.5
6	Ifedapo	2,300	93	24	4.5
7	Oranmiyan	12,664	511	25	10.4
8	Iwo	3,555	143	25	10.4
9	Osogbo	4,600	187	25	10.4
10	Ede	3,140	127	25	10.4
11	Ilesa	7,781	304	25	10.4
12	Irepo	1,238	49	25	10.4
13	Odo-Otin	2,318	92	25	10.4
14	Kajola	1,591	64	25	10.4
15	Akinyele	2,291	89	26	16
16	Ibarapa	2,467	95	26	16
17	Ejigbo	2,008	77	26	16
18	Ogbomoso	4,578	168	27	19
19	Irewole	4,675	173	27	19
20	Ila	2,098	79	27	19
21	Oluyole	4,686	166	28	21
22	Lagelu	2,026	70	29	22
23	Atakunmosa	2,392	79	30	23
24	Irepodun	1,182	29	41	24
	All States	110,518	4,438	25	

Table 4.13

Average Number of Student per Secondary School by LGAs 1978/79 (R_8)

Serial No.	Name of LGAs	No. of Schools	Enrolment (in 000's)	Average Size	Rank
0	1	2	3	4	5
1	Ibadan	34	22.4	659	1
2	Osogbo	7	4.6	657	2
3	Ilesa	14	7.8	556	3
4	Oyo	13	6.7	513	4
5	Lagelu	4	2.0	507	5
6	Ejigbo	4	2.0	502	6
7	Ifelodun	9	4.8	487	7
8	Oluyole	10	4.7	469	8
9	Ifedapo	5	2.3	460	9
10	Oranmiyan	28	12.7	452	10
11	Ede	7	3.1	449	11
12	Irewole	11	4.7	425	12
13	Ila	5	2.1	420	13
14	Irepo	3	1.3	413	14
15	Atakunmosa	6	2.4	399	15
16	Iwo	9	3.6	395	16
17	Irepodun	3	1.2	394	17
18	Ogbomoso	12	4.6	382	18.5
19	Akinyele	6	2.3	382	18.5
20	Obokun	18	6.8	378	20
21	Ibarapa	7	2.5	352	21
22	Iseyin	8	2.7	332	22
23	Odo-Otin	7	2.3	331	23
24	Kajola	6	1.6	265	24
25	All State	236	110.7	469	

(ix) Unit Cost Per Student Year (R_9)

This is in fact a partial synthetic indicator of the efficiency and quality indicators mentioned earlier on in this chapter. It includes a number of items which correspond to the condition of schooling such as: salaries of teachers and of other personnel, maintenance, supply of materials etc. It is calculated by dividing the total current costs by the student population in different LGAs. R_9 has been computed with the help of the following formula:

$$R_9 = \frac{C_1 + C_2 + C_3}{S_2}$$

where

S_2 = Enrolment in secondary schools

C_1 = Salaries of teaching and non-teaching staff

C_2 = Allowances of teaching and non-teaching staff

C_3 = Other current expenditure.

Table 4.14 gives average cost per student year in different LGAs. It is observed that unit cost was ₦130.43 in Atakunmosa LGA as against ₦274.06 in Oranmiyan LGA. In the remaining LGAs, there are a lot of variations in the unit cost of education.

Table 4.14

Unit Cost per Student Year by LGAs 1978/79 (R_9)

Serial No.	Name of LGAs	No. of Student (in 000's)	Total Recurrent cost (in 000's) ₦	Cost per Student ₦	Rank
0	1	2	3	4	5
1	Oranmiyan	12.7	3,480.61	274.06	1
2	Ibadan	22.4	4,888.03	218.22	2
3	Osogbo	4.6	915.81	199.09	3
4	Oyo	6.7	1,314.43	196.18	4
5	Ibarapa	2.5	480.96	192.38	6
6	Ilesa	7.8	1,512,30	193.88	5
7	Iwo	3.6	684.02	190.00	7
8	Irepodun	1.2	216.47	183.39	10
9	Ogbomoso	4.6	837.62	182.09	9
10	Ede	3.1	569.26	183.63	8
11	Ifedapo	2.3	404.94	176.06	11
12	Iseyin	2.7	461.41	170.89	14
13	Obokun	6.8	1,172.38	172.40	12
14	Odo-Otin	2.3	393.89	171.26	13
15	Akinyele	2.3	388.20	168.78	15
16	Kajola	1.6	267.65	167.75	16
17	Irewole	4.7	745.81	158.68	17
18	Irepo	1.3	195.89	150.68	19
19	Ila	2.1	327.72	156.06	18
20	Ifelodun	4.4	652.32	148.25	21
21	Oluyole	4.7	685.27	145.80	22
22	Lagelu	2.0	296.07	148.53	20
23	Ejigbo	2.0	275.81	137.90	23
24	Atakunmosa	2.4	313.03	130.43	24
25	All State	110.7	21,479.90	194.04	

Synthesis of the Indicators

Table 4.15 gives a synoptic view of the variations in nine indicators discussed in the preceding sections. It is observed from the table that the value of the co-efficient of variation is highest with respect to allocation of education expenditure per head of population due to the urban/rural dichotomy in educational development. It is followed by the average radius per catchment area, and the average population served by one secondary school. There are similar variations in R_2 and R_4. However, the coefficient of variation is low with respect to R_5, R_8, followed by R_9. It is clear from the table that indicators chosen for the analysis do reflect variation between different Local Government Areas.

It is interesting to note that there is the least variation in R_7 i.e., student/teacher ratio because all the Local Government Areas have their student/teacher ratio between 21 and 28 except Irepodun Local Government Area which has a student/teacher ratio of 40.8.

Scale Intervals: The construction of the scale and scale intervals has been done on the basis of mean ($\bar{x}$) and standard deviation (σ). In actual practice, these intervals are adjusted on the basis of actual norms and pedagogical considerations. However, we have relied on the mean and standard deviation for choosing scale intervals. In the present analysis, invervals have been chosen from either of the following two sets of scale intervals depending on the choice of the indicator (R).

Table 4.15: Mean Values and Coefficients of Variation with Respect to Nine Indicators, 1978/79.

S/No.	Indicator	Mean	Standard Deviation	Co-efficient of variation
0	1	2	3	4
1	R_6	2.93	1.6	65.0
2	R_3	11.2	7.2	64.3
3	R_2	31025.8	22269.5	55.95
4	R_4	10.1	5.4	52.7
5	R_1	13.9	6.9	50.0
6	R_5	11.2	4.6	38.0
7	R_8	469.06	96.5	21.7
8	R_9	194.04	30.1	17.1
9	R_7	25	3.6	13.8

Table 4.16: Scale Intervals Chosen for Ranking Local Government Areas

	1st Set	2nd Set
Rank	Scale Interval	Scale Interval
1	$O \leq R < \bar{X} - \sigma$	$R \geq \bar{X} + \sigma$
2	$\bar{X} - \sigma \leq R < \bar{X}$	$\bar{X} \leq R < \bar{X} + \sigma$
3	$\bar{X} \leq R < \bar{X} + \sigma$	$\bar{X} - \sigma \leq R < \bar{X}$
4	$R \geq \bar{X} + \sigma$	$O \leq R < \bar{X} - \sigma$

Scale intervals have been arranged in Table 4.17 according to the first set with respect to R_2, R_3, R_4, R_7 and R_1, R_5, R_6 and R_9 have been arranged according to the second set.

On the basis of scale intervals given in Table 4.17, rank scores with respect to different indicators have been chosen and shown in Table 4.18. Column 10 shows the aggregated values of indicators for each local government areas. It may be mentioned that for the purpose of synthesis we have excluded unit cost indicator (R_9). This will be taken up separately towards the end of the chapter.

On the basis of synthetic index of educational development (P_1) given in column 10 of Table 4.18, LGAs have been ranked and categorised into four groups shown

Table 4.17

Scale Intervals with Respect to Nine Indicators

Rank	R_1	R_2 in (000's)	R_3	R_4	R_5	R_6	R_7	R_8	R_9
1	20 and more	16 and less	4 and less	3 or less	17 and more	4 and more	22 and less	556 and more	218 and m
2	14 - 19	17 - 37	5 - 10	4 - 11	12 - 16	2.6-3.9	23-25.9	449-555	199-217
3	8 - 13	38 - 53	11 - 17	12 - 17	7 - 11	0.96-2.5	26 - 29	352-448	174-198
4	7 and less	54 - 77	18 and more	18 - 31	5 - 6	0.80-0.95	30 and more	265-351	1 173

Table 4.18

Score Value for the Eight Indicators per Local Government 1978/79

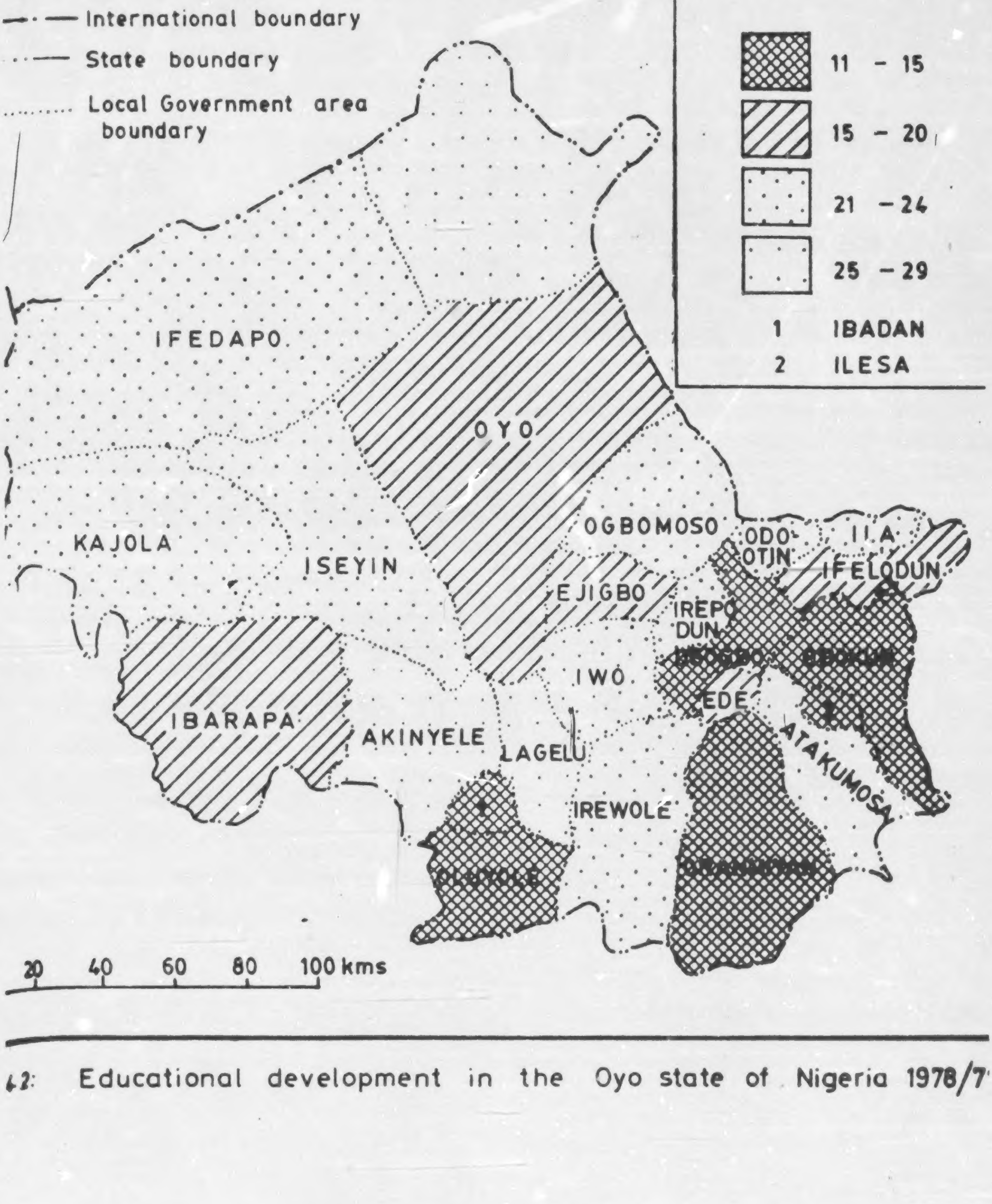
Serial No.	Name of Local Government	R_1	R_2	R_3	R_4	R_5	R_6	R_7	R_8	P_1
0	1	2	3	4	5	6	7	8	9	10
1	Ilesa	1	2	1	1	1	1	2	1	10
2	Obokun	1	1	2	2	1	1	2	2	12
3	Ibadan	1	2	1	2	3	1	2	1	13
4	Osogbo	3	3	1	2	1	2	2	1	15
5	Oranmiyan	1	2	2	2	3	1	2	2	15
6	Oluyole	1	1	2	3	2	1	3	2	15
7	Ifelodun	2	2	2	2	1	3	2	2	16
8	Oyo	2	2	3	3	3	2	1	2	18
9	Ede	3	2	2	2	2	3	2	2	18
10	Ejigbo	3	2	2	2	2	3	3	3	20
11	Ibarapa	2	2	3	3	3	2	2	3	20
12	Iwo	3	3	2	2	3	3	2	3	21
13	Ila	3	3	2	2	3	3	3	3	21
14	Ifedapo	3	2	4	2	3	3	2	2	21
15	Irewole	3	2	2	3	3	3	3	3	22
16	Odo-Otin	3	2	2	2	2	3	2	4	20
17	Iseyin	3	2	3	2	3	3	2	4	22
18	Irepodun	4	4	2	3	1	3	4	1	22
19	Kajola	3	2	4	2	3	3	2	4	23
20	Ogbomoso	3	3	2	3	3	3	3	3	23
21	Atakunmosa	3	2	3	3	4	3	4	3	25
22	Lagelu	4	4	2	4	4	3	3	2	26
23	Akinyele	3	3	3	4	4	3	2	3	25
24	Irepo	4	4	4	2	3	4	2	3	26

in Table 4.19. These Local Government Areas have also been shaded in Fig. 4.2

Table 4.19: Categorisation of the Local Government Areas According to Total Index of Educational Development 1978/79

Categories	Condition	Local Government
0	1	2
11 - 15	Educational Advanced	1,2,3,4,5,6
16 - 20	Less Educationally Advanced	7,8,9,10,11
21 - 24	Educationally Developing	12,13,14,15,16, 17,18,19,20
25 - 29	Less Educationally Developing	21, 22, 23, 24

From the different shadings in Fig. 4.2, the most Educationally Advanced Local Government is Ilesha, followed by Obokun with joint index of 10 and 12 respectively. Ibadan, Osogbo and Oranmiyan Local Government followed in succession. The joint index ranking 16-20 denote less educationally advance Local Government Areas. They include Ifebodun, Oyo, Ede, Ejigbo and Ibarapa Local Governments. The educationally developing Local Governments include Iwo, Ila, Ifedapo, Irewole, Odo-Otin, Iseyin, Irepodun, Kajola and Ogbomosho. The last category


International boundary
State boundary
Local Government area boundary
11 - 15
15 - 20
21 - 24
25 - 29
1 IBADAN
2 ILESA
IFEDAPO
OYO
OGBOMOSO
ODO OTIN
ILA
IFELODUN
KAJOLA
ISEYIN
EJIGBO
IREPO DUN
OSOGBO
IWO
EDE
IBARAPA
AKINYELE
LAGELU
ATAKUMOSA
IREWOLE
OLUYOLE
20
40
60
80
100 kms

4.2: Educational development in the Oyo state of Nigeria 1978/7 rank 25-29 shows less Educationally Developing Local Governments. They include Atakumosa, Lagelu, Akinyele and Irepo.

It was further felt that we may examine the educational development in different LGAs by assigning a double weighting to access indicators (R_1, R_2, R_3, R_4, R_5, R_6) as compared to efficiency and quality indicators (R_7, R_8). The resultant index is designed as P_2. where $P_2 = 2(R_1 + R_2 + R_3 + R_4, + R_5 + R_6) + R_7 + R_8$. Obviously P_2 classifies LGAs according to educational development where expansion is given higher weighting as compared to quality and efficiency of education. Similarly, P_3 has been computed by reversing the order of it to compute education development index with more emphasis on quality and efficiency of education as compared to expansion in education. In other words, $P_3 = (R_1 + R_2 + R_3 + R_4 + R_5 + R_6) + 2(R_7 + R_8)$. The values of indices P_1, P_2, P_3 are given in Table 4.20.

In order to find out how sensitive the index is to weighting schemes, rank correlation (R) has been computed between the three indices. The results are given below:

$R\ (P_1\ P_2) = 0.78$

$R\ (P_2\ P_3) = 0.89$

$R\ (P_3\ P_1) = 0.98$

It is observed that rank correlation between P_3 and P_1 is very high, that is 0.98. On the other hand, correlation between P_1 and P_2 indices is only 0.78. It is clear therefore that it is desirable to compute

Table 4.20: P_1, P_2 and P_3 Education Development Indices by Local Government Areas, 1978/79

S/no.	Name of LGA	P_1		P_2		P_3	
		Value	Rank	Value	Rank	Value	Rank
1	Ilesa	10	1	17	1	13	1
2	Obokun	12	2	20	2	16	2
3	Ibadan	13	3	23	3	16	3
4	Osogbo	14	4	27	6	18	4
5	Oranmiyan	15	5	26	5	19	5
6	Oluyole	15	6	25	4	20	6
7	Ifelodun	17	7	28	7	20	7
8	Oyo	18	8	33	9	21	8
9	Ede	19	9	32	8	22	9
10	Ejigbo	20	10	34	10	26	12
11	Ibarapa	20	11	35	12	25	10
12	Iwo	21	12	37	25	26	13
13	Ila	21	13	36	14	27	15
14	Ifedapo	21	14	38	16	25	11
15	Irewole	22	15	38	17	28	17
16	Odo-Otin	22	16	34	11	26	14
17	Iseyin	22	17	38	18	28	18
18	Irepodun	22	18	39	19	27	16
19	Kajola	23	19	40	20	29	19
20	Ogbomoso	23	20	40	21	29	20
21	Atakunmosa	25	21	35	13	32	24
22	Lagelu	26	22	47	23	31	22
23	Akinyele	26	23	45	22	30	21
24	Irepo	26	24	47	24	31	23
		473		746		585	

Table 4.21: Ranking of Local Government Areas on the Basis of Joint Index and Unit Cost of Education

Serial No.	Local Government Area	Urban Centre	Joint Index	Unit Cost
0	1	2	3	4
1	Ilesa	Ilesa	1	6
2	Obokun	Ijebu-Jesa	2	13
3	Ibadan	Ibadan	3	2
4	Osogbo	Osogbo	4	3
5	Oranmiyan	Ile-Ife	5	1
6	Oluyole	Idi-Ayunre	6	22
7	Ifelodun	Ikirun	7	21
8	Oyo	Oyo	8	4
9	Ede	Ede	9	8
10	Ejigbo	Ejigbo	10	23
11	Ibarapa	Eruwa	11	6
12	Iwo	Iwo	12	7
13	Ila	Ila-Orangun	13	18
14	Ifedapo	Saki	14	11
15	Irewole	Ikire	15	17
16	Odo-Otin	Okuku	16	13
17	Iseyin	Iseyin	17	14
18	Irepodun	Kobu	18	10
19	Kajola	Okeho	19	16
20	Ogbomoso	Ogbomoso	20	9
21	Atakunmosa	Oso	21	24
22	Lagelu	Iyana-Ofa	22	20
23	Akinyele	Moniya	23	15
24	Irepo	Kisi	24	19

P_1 and P_2 and not necessarily P_3 because P_1 and P_3 are highly correlated. In concluding this analysis, attempt is made to juxtapose in Table 4.21 the position of different local government areas with respect to joint index given in Table 4.18 and unit cost of education. The rank correlation coefficient between the two indices is of the order of 0.475. This was calculated with the formula below:

$$R = 1 - \frac{6 \sum (d)^2}{N (N^2 - 1)}$$

where

d = the difference between joint index unit cost and

N = is number of local governments.

It is thus clear that unit cost indicator goes hand in hand with the joint index and can therefore be used as a partial indicator of educational development.

This Chapter has shown the status of secondary educational development in Oyo State. In particular, critical action areas of the state which require immediate improvement in secondary schooling have been highlighted. In the next chapter, the enrolment and teaching manpower in the selected secondary schools for the same period will be analysed to find out variations across Local Government Areas.

CHAPTER V

ANALYSIS OF ENROLMENT AND TEACHING STAFF

The present chapter gives an analysis of enrolment, teaching manpower and other related characteristics of 30 secondary schools selected for micro cost analysis. All the schools are publicly managed, 26 of them are mixed schools, three are boys' schools and one is a girls' school. A list of the selected secondary schools is given in Appendix B.

The schools are classified into rural and urban schools: all schools which are located in urban centres (capital city/town of LGAs) being classified as urban schools and the remaining schools are categorised as rural schools.

Table 5.1 gives the distribution of the 30 selected secondary schools according to rural-urban locations and the periods of their establishment. Average size is computed and shown in columns 4 and 7.

Table 5.1: Rural-Urban Location of 30 Schools According to Periods of Establishment and Average Size

S/No.	Period	RURAL			URBAN		
		No. of Schools	Enrolment	Average size	No. of Schools	Enrolment	Average Size
	1	2	3	4	5	6	7
1	Before 1961	3	1,680	560	11	9,323	847
2	1962 - 1969	2	879	439	7	5,288	755
3	1970 - 1974	2	1,248	624	-	-	-
4	1975 - 1980	1	336	336	4	1,196	299
5	Total		4,143	517	22	15,807	718

From Table 5.1, it is observed that the total enrolment covered by the 30 selected secondary schools is about 20 thousand student population. 46.7 percent of these schools were established before 1961 and another 30 percent between 1962 and 1969. Average size of schools located in urban areas is 718 as against 517 in rural areas, which is 38.9 percent higher. 4 urban schools established during the third development plan are of the average size of 299 and the one established in rural areas during this period is of the size of 336. Detail characteristics of the selected schools is given in Appendix C.

Growth Rates in Enrolment

The growth in enrolment by sex in the selected schools between 1978/79 and 1979/80 is juxtaposed side by side for rural and urban areas. Table 5.2 presents the growth rate of enrolment by sex in urban and rural areas, 1978-79 and 1979-80.

Table 5.2: Growth Rate of Enrolment by Sex in Urban and Rural Areas 1978-79 & 1979-80

S/No.	Year	RURAL		URBAN		Rural & Urban	
		Boys	Girls	Boys	Girls	Boys	Girls
0	1	2	3	4	5	6	7
1	1978/79	3,460	1,364	9,428	5,598	12,888	6,962
2	1979/80	4,082	1,696	11,059	6,112	15,141	7,808
3	Growth Rate (%)	17.98	24.34	17.29	9.18	17.48	12.15

From Table 5.2 it is observed that enrolment of boys increased at an annual growth rate of 17.5 percent as against 12.2 percent per annum when both rural and urban schools are put together.

With respect to rural schools, growth rate of enrolment of girls was 24.3 percent as against 18 percent increase in enrolment of boys. In urban schools, boys enrolment increased by 17.3 percent as compared to 9.2 percent growth in girls enrolment. When urban and rural schools are compared, it is observed that enrolment of girls is growing faster than that of boys in rural schools than in urban schools. It appears that the enrolment net at the secondary stage is spreading to areas which earlier on had been neglected.

Table 5.3 gives annual growth rate for individual schools mentioned in Table 5.1.

Enrolment in all the schools increased from over 19 thousands in 1978/79 to 22.9 thousands in 1979/80, an increase of 14.9 percent. It is interesting to observe that annual growth rate for schools in rural areas was slightly higher (19.59 per cent) as compared to that of the schools in urban areas (13.5 percent). It is also seen from the table that out of the 8 schools in rural areas, one school had lower enrolment in 1979/80 as compared to 1978/79. The remaining schools showed annual growth rate varying from 18 to 35 percent during the two years. Out of the 22 schools in urban areas, only one school showed a decline in enrolment and

Table 5.3 : Annual Growth Rates of Individual Schools By Rural and Urban Between 1978/79 - 1979/80

	RURAL			URBAN		
	Enrolment			Enrolment		
Code No.	1978/79	79/80	Growth Rate	78/79	1979/80	Growth Rate
0	1	2	3	4	5	6
1	-	-	-	286	477	66.8
2	536	651	21.4	-	-	-
3	-	-	-	865	901	4.2
4	-	-	-	508	808	59.0
5	889	1,049	17.9	-	-	-
6	-	-	-	773	849	9.8
7	-	-	-	835	999	19.6
8	-	-	-	640	611	-4.5
9	791	985	24.5	-	-	-
10	-	-	-	1,218	1,245	2.2
11	665	809	21.6	-	-	-
12	-	-	-	1,040	1,293	24.3
13	583	547	-6.2	-	-	-
14	-	-	-	631	637	0.95
15	-	-	-	632	774	22.5
16	-	-	-	683	726	6.3
17	336	455	35.4	-	-	-
18	-	-	-	105	269	156.2
19	-	-	-	674	852	26.4
20	-	-	-	976	1,033	5.8
21	293	345	17.7	-	-	-
22	-	-	-	898	958	6.7
23	-	-	-	681	704	3.4
24	-	-	-	656	688	4.9
25	731	928	26.9	-	-	-
26	-	-	-	689	747	8.4
27	-	-	-	712	787	10.5
28	-	-	-	297	363	22.2
29	-	-	-	644	670	4.0
30	-	-	-	683	780	14.2
TOTAL	4,[illegible]	5,769	19.59	15,126	17,171	13.5

50 percent of them had enrolment growth rate below 10 percent while 7 of the schools had growth rates varying from 20 percent to 66.8 percent. One school had an enrolment growth rate of 156 percent.

Flow Rates in Enrolment

Table 5.4 gives flow rate by sex and classes between 1978/79 and 1979/80.

Table 5.4 : Flow Rates by Sex 1978/79-1979/80

Year	BOYS					GIRLS				
	I	II	III	IV	V	I	II	III	IV	V
1978/79	3546	3160	3048	2241	1601	1687	1698	1604	1083	890
1979/80	3497	3485	3154	2685	1850	1984	1954	1701	1402	925
Flow Rate		98.3	99.8	88.1	82.5		115.8	100.2	87.4	85.4

It is observed from the Table that flow rates both for boys and girls diminish as level of class increases from I to V. It may immediately be pointed out that in case of girls, flow rates are more than 100 percent with respect to classes I and II and II to III. The flow rates which exceeded 100 percent might be due to inter-institutional migration; this aspect can be further studied for accuracy.

Table 5.5 : Sex-wise Distribution of Teachers in Rural and Urban Schools 1978/79

Code No.	RURAL			URBAN		
	Male	Female	% Female to Total	Male	Female	% Female to Total
0	1	2	3	4	5	6
1	-	-	-	3	17	85.0
2	21	3	12.5	-	-	-
3	-	-	-	26	5	16.1
4	-	-	-	15	9	37.5
5	32	7	18.0	-	-	-
6	-	-	-	29	6	17.1
7	-	-	-	41	9	18.0
8	-	-	-	20	11	35.5
9	18	13	41.9	-	-	-
10	-	-	-	35	6	14.6
11	17	4	19.0	-	-	-
12	-	-	-	46	15	24.6
13	20	15	43.0	-	-	-
14	-	-	-	17	13	43.3
15	-	-	-	20	11	35.5
16.	-	-	-	16	8	33.3
17	18	1	5.3	-	-	-
18	-	-	-	2	12	86.0
19	-	-	-	20	13	39.4
20.	-	-	-	35	5	12.5
21	18	6	25.0	-	-	-
22	-	-	-	33	12	26.7
23	-	-	-	12	3	20.0
24	-	-	-	23	7	23.3
25	11	6	35.3	-	-	-
26.	-	-	-	8	24	75.0
27	-	-	-	22	8	26.7
28	-	-	-	28	2	6.7
29	-	-	-	22	8	26.7
30	-	-	-	20	4	16.7
TOTAL	155	55	26.2	490	208	29.8

Teaching Staff

Table 5.5 presents the rural/urban school-wise data of teachers by sex. In all, there are 911 teachers in the 30 schools for a student population of over 19 thousand. This gives an overall student/teacher ratio of the order of 21.97. It is also important to note that for calculating the student/teacher ratio for individual schools the principals were excluded in all these 30 schools since most of them are engaged in administrative duties.

The percentage share of female teachers varied from school to school with respect to rural schools. It was 26.2 percent in rural schools as against 29.8 percent in urban schools. It ranged from 5.3 to 43.0 percent in rural schools while it ranged from 6.7 to 86 percent in urban schools.

Table 5.6 gives percentage of trained teachers in rural and urban schools. It is seen from the table that 68 percent of the teachers in rural schools were trained as against 68.3 percent in urban schools.

Table 5.6 : Percentage of Trained Teachers By Rural and Urban Location - 1978/79

S/No. (0)	Rural (1)	% (2)	Urban (3)	% (4)
Trained	151	68	482	68.3
Untrained	71	32	224	31.7
Total	222	100	706	100

Table 5.7 : Number of Teachers per Class in Rural and Urban Schools 1978/79

Schl. Code	RURAL			URBAN		
	No. of Classes	No. of Teachers	No. of Teachers per class	No. of Classes	No. of Teachers	No. of Teachers per class
0	1	2	3	4	5	6
1	-	-	-	8	19	2.4
2	14	13	0.93	-	-	-
3	-	-	-	21	30	1.4
4	-	-	-	6	23	3.8
5	24	18	0.75	-	-	-
6	-	-	-	22	34	1.5
7	-	-	-	23	49	2.1
8	-	-	-	15	30	2.0
9	21	30	1.4	-	-	-
10	-	-	-	27	40	1.5
11	20	20	1.0	-	-	-
12	-	-	-	29	60	2.1
13	12	34	2.8	-	-	-
14	-	-	-	18	29	1.6
15	-	-	-	18	30	1.7
16	-	-	-	16	23	1.4
17	9	18	2.0	-	-	-
18.	-	-	-	3	13	4.3
19	-	-	-	18	32	1.8
20	-	-	-	25	39	1.6
21	9	23	2.6	-	-	-
22	-	-	-	20	44	2.2
23	-	-	-	18	14	0.8
24	-	-	-	17	29	1.7
25	23	16	0.7	-	-	-
26	-	-	-	19	31	1.6
27	-	-	-	16	29	1.8
28	-	-	-	8	29	3.6
29	-	-	-	18	29	1.6
30	-	-	-	18	23	1.3
	132	202	1.53	384	679	1.8

Table 5.8 : Student/Teacher Ratio for 30 Selected Schools by Rural and Urban Classification 1978/79

S/No.	RURAL			URBAN		
	Enrolment	No. of Teachers	Student/Teacher Ratio	Enrolment	No. of Teachers	Student/Teacher Ratio
0	1	2	3	4	5	6
1	-	-	-	286	19	15.1
2	536	23	23.3	-	-	-
3	-	-	-	865	30	28.8
4	-	-	-	508	23	22.1
5	889	38	23.4	-	-	-
6	-	-	-	773	34	22.7
7	-	-	-	835	49	17.0
8	-	-	-	640	30	21.3
9	791	30	26.4	-	-	-
10	-	-	-	1,218	40	30.5
11	665	20	33.3	-	-	-
12	-	-	-	1,040	60	17.3
13	583	34	17.1	-	-	-
14.	-	-	-	631	29	21.8
15.	-	-	-	632	30	21.1
16	-	-	-	683	23	29.7
17	336	18	18.7	-	-	-
18	-	-	-	105	13	8.1
19	-	-	-	674	32	21.1
20	-	-	-	976	39	25.0
21	293	23	12.7	-	-	-
22	-	-	-	898	44	20.4
23	-	-	-	681	14	48.6
24	-	-	-	656	29	22.6
25	731	16	45.7	-	-	-
26	-	-	-	689	31	22.2
27	-	-	-	712	29	24.6
28	-	-	-	297	29	10.2
29	-	-	-	644	29	22.2
30	-	-	-	683	23	29.7
	4,824		23.9	15,126	679	22.3

Table 5.7 gives number of teachers per class by rural and urban location. It is observed from the Table that average number of teachers per class is 1.7 in rural schools as against 1.9 in urban schools. It ranges from 1.0 to 2.0 in rural schools and 0.8 to 3.8 in urban schools. The differences between rural and urban schools may be noted.

Table 5.8 gives student/teacher ratio for individual schools in rural and urban areas. We observed that student/teacher ratio in urban areas is 22.3 as against 23.9 in rural areas. It varies from 12.7 to 45.7 in rural schools as against 10.2 to 48.6 in urban schools. When we analyse student/teacher ratio for individual schools, it is observed that most of the urban schools have student/teacher ratio around 20 and 25.

Table 5.9 gives percentage distribution of teachers in rural and urban schools.

Table 5.9 : Age Distribution of Teachers by Rural and Urban Location 1978/79

S/No. (0)	Age Group (1)	Rural (2)	Urban (3)
1	19	4.09	3.39
2	20 - 24	31.41	16.55
3	25 - 29	19.26	23.22
4	30 - 34	22.08	23.83
5	35 - 39	9.59	13.97
6	40 - 44	7.19	9.15
7	45 - 49	3.18	5.79
8	50 - 54	3.20	2.27
9	55 - 59	-	1.64
10	60	-	0.20
11	Total %	100	100
12	Total No.	211	700

It is observed from the Table that about 55 percent of teachers employed in rural schools are below 30 as against 43 percent in urban schools. With respect to age group 30-44, percentage share of teachers in urban schools was 47 percent as against 39 percent in rural schools. These trends in age profile of teachers in rural/urban schools are singificant in terms of their influence on size of unit cost of education.

Table 5.10 gives qualification profile of 911 teachers from the 30 selected secondary schools.

Table 5.10: Qualification Profile of Teachers in Rural and Urban Schools, 1978/79

S/No.	Qualifications	Rural	Urban	% Distribution
0	1	2	3	4
	Graduates:			
1	With teaching qualification	59	171	25.25
2	Without teaching qualification	31	200	25.36
	Non-Graduates			
3	N.C.E.	58	143	22.06
4	Grades I and II	12	70	9.00
5	W.A.S.C.	18	30	5.27
6	W.A.S.C. and Grade II	23	68	9.99
7	A/L and H.S.C.	9	19	3.07
	Total No.	210	701	
	Total (%)	23.05	76.95	100

It is observed from Table 5.10 that out of the 911 teachers, 25.25 percent were trained graduate teachers, 25.36 percent represent untrained graduate teachers, 31.06 percent represent trained non-graduate teachers and 18.33 percent were untrained non-graduate teachers.

This Chapter has been devoted to the description of the 30 selected schools for micro cost analysis. We have seen from the analysis, variations within individual schools with respect to growth rates, in enrolment, flow-rates in enrolment, student-teacher ratio, distribution of teachers by sex, qualification and age. The discussion of the findings of these analysis are given in Chapter Eight.

From the results of the analysis in this chapter, it is clear that some elements of educational cost, such as, enrolment, student-teacher ratio, qualification of teachers, teachers' salary, are sufficiently varied within schools to warrant investigation when educational policies are being considered. As a basis for such investigation, a detail analysis of such factors would be very useful data. In Chapter Seven, a detail analysis of factors influencing unit cost will be given. Unit cost will be analysed in the next chapter to see variations in different schools located in the different LGAs, and also to observe behaviours of the unit cost in relation to size of schools.

CHAPTER VI

ANALYSIS OF UNIT COSTS

In the present chapter, an attempt is made to estimate unit cost of secondary education on the basis of data collected from 30 schools. The objective being to show variation in unit spending by different schools. As mentioned earlier, the real cost of an activity is not the money spent on it. Rather, it is the alternative opportunities that have to be sacrificed when a particular choice is made. In the absence of detailed data, it is difficult to estimate alternatives foregone (opportunity cost) with respect to each input allocated to the educational process. Therefore, expenditure incurred on each input is assumed to represent the real cost of the educational activities in the schools covered by the survey.

Causes of Variations in Unit Cost

Unit spending in schools vary according to the diversity and intensity of the services provided by schools, including the teaching (type of syllabus), educational and vocational guidance, administration, boarding facilities, health care etc. The production function of these services, i.e. the real resources which are actually used in their production, and the resource combination pattern; and some characteristics of the resources used in the production of these services, especially, the qualifications of staff and experience of staff contribute a great deal to the level of spending of individual schools. Finally, unit spending will depend on the efficiency with which resources are used.

In Table 6.1, we present the structure of current expenditure in the selected secondary schools in Oyo State.

Table 6.1: Structure of Currect Cost in 30 Selected Schools 1978/79

S/No.	Item	Amount in 000's (₦)	% of Total
0	1	2	3
1	Teachers salary and Allowances	3,197.36	77.05
2	Non-Teachers Salary and Allowances	587.54	14.16
3	Stationery	79.64	1.92
4	Laboratory Equipment	81.78	1.97
5	Water and Electricity	56.19	1.35
6	Repairs and Maintenance	75.26	1.81
7	Library and Miscellaneous	72.08	1.74
Total		4,149.85	100.00

In the 1978/79 academic session, the total recurrent expenditure incurred by the 30 schools amounted to ₦4.5 million. Out of this, salary oriented expenditure constituted 92.21 percent. The teachers salaries and allowances amounted to a little over three quarters of the total recurrent expenditure. Consumable materials used in the laboratories amounted to 1.97 percent; water and electricity accounted for 1.35 percent and expenditure on repairs and maintenance formed 1.81 percent of the total recurrent expenditure during this period. In other words, Table 6.1 gives weighting structure of the recurrent expenditure by items in secondary education.

Table 6.2 gives the distribution of recurrent expenditure of the selected schools according to rural and urban location.

Table 6.2 : Rural-Urban Structure of Recurrent Expenditure in 30 Selected Schools 1978/79

S/No.	Items	RURAL		URBAN	
		000's (₦)	%	000's (₦)	%
0	1	2	3	4	5
1	Teachers Salary and Allowance	698.62	74.05	2,498.74	77.93
2	Non-Teachers Salary and Allowances	131.60	13.95	455.93	14.22
3	Stationery	23.92	2.54	55.72	1.74
4	Laboratory Equipment	24.93	2.64	56.84	1.76
5	Water and Electricity	16.27	1.72	39.93	1.25
6	Repairs and Maintenance	21.77	2.31	53.49	1.67
7	Library and Miscellaneous	26.37	2.79	45.72	1.43
8	TOTAL	943.48	100.00	3,206.37	100.00

It is observed from the comparative analysis of weightages of different items that teachers salaries and allowances have lower weightage in rural schools (74.1 percent) as against urban schools where the weightage is 77.93 percent. Similar differences exist with respect to non-teachers salaries. All other non-salary items in rural schools are higher than those in urban schools.

In Table 6.3, we present unit cost per student year in rural and urban schools separately. Unit cost per student year has been arrived at by dividing the total recurrent expenditure by the enrolment in each school. From the table, it is seen that average unit cost varies from ₦159.36 to ₦236.28 in rural schools and from ₦120 to ₦378.71 in urban schools. The ratio between lowest and highest unit costs in rural schools came to 1:1.48 as against 1:3.16 in urban schools. The average unit cost per student year in urban and rural schools put together amounted to ₦205.43. The average unit cost per student year came to ₦203.39 in rural schools as against ₦206.20 in urban schools.

In Table 6.4, unit cost of secondary schools is presented according to the periods of their establishment to show the trend in unit cost between 1958 and 1980. In this regard, schools established before 1961 are grouped together to represent schools before independence. Schools established during the First National Development Plan (1962 - 1968) formed the second group of schools, the

Table 6.3 : Unit Cost per Student Year 1978/79

School Code 1	Rural Unit Cost (₦) 2	Urban Unit Cost (₦) 3
1	-	228.70
2	168.85	-
3	-	142.43
4	-	128.43
5	183.81	-
6	-	232.29
7	-	240,19
8	-	281.34
9	236.28	-
10	-	186,72
11	160.83	-
12	-	327.46
13	253.90	-
14	-	155.13
15	-	197.33
16	-	193.52
17	158.77	-
18	-	378,71
19	-	326,59
20	-	173,62
21	208.05	-
22	-	260,21
23	-	120.32
24	-	249,28
25	182.47	-
26	-	190,04
27	-	184.85
28	-	262,04
29	-	190.04
30	-	127,26

Table 6.4 : Unit Cost for 30 Secondary Schools in Oyo State by Periods of Establishment, 1958 - 80

S/No	Period Founded	Teachers Salary	Non-Teachers Salary	Stationery	Lab. Equip	Water & Electricity	Repair and Maint.	Library and Others	Unit Cost (₦)	No. of Schools
0	1	2	3	4	5	6	7	8	9	10
1	Before 1961	167.20	31.64	4.01	4.37	2.84	4.05	3.71	217.84	14
2	1962-68	153.65	20.66	4.01	3.74	2.70	3.26	3.54	194.34	9
3	1970-74	142.30	40.30	5.21	4.01	3.53	4.33	4.73	204.31	2
4	1975-80	151.73	29.17	4.13	3.64	2.52	3.35	2.32	196.86	5

Source: Appendix E

schools established during the Second Development Plan (1970 - 1974) formed the third group of schools, and the schools established during the Third National Development Plan (1975 - 80) formed the fourth group of schools.

In Table 6.4, it is observed in column 10, that unit cost does not show any regular behaviour pattern. The unit cost for the first group of schools works out to be ₦207.62 and ₦194.34 for the second group of schools. Then, it increases to ₦204.31 with respect to the third group of schools but comes down to ₦196.86 with respect to the fourth group of schools.

Table 6.5 presents variations in the unit cost of the different groups of schools by their periods of establishment.

Table 6.5 : Variation in Unit Cost of Education by Groups of Schools by Different Periods of their Establishment

S/No	Period Founded	Average Cost	Coefficient of of Variation	Ratio of Lowest to Highest Unit Cost
0	1	2	3	4
1	Before 1961	217.84	27.86	1:2.7
2	1962-69	194.34	20.4	1;1.9
3	1970-74	204.31	31.7	1:1.6
4	1975-80	196.86	42.4	1:2.9

Source: Appendix E

From Table 6.5, it is observed that the coefficient of variation is highest with respect to the fourth group of schools, followed by the third, first and second groups of schools. The ratio between the lowest and the highest unit cost is 1:16 with respect to the third group of schools, followed by the fourth group of schools with 1:13.

Unit Cost and Size of Schools

In this section, attempt is made to identify certain patterns of unit cost of education in relation to the size of the individual schools. Schools have been grouped into six categories according to relationship between unit cost of education and size of schools.

Table 6.6 gives enrolment, total recurrent cost and average unit cost of these schools. From the table, we observe that in the first group of schools, unit cost increases with an increase in the size of the schools and in the remaining five groups of schools, unit cost decreases with increase in the size of schools. There is, therefore, an evidence of economies of scale with respect to the five groups of schools and an evidence of diseconomies of scale with respect to the first group of schools.

Furthermore, Table 6.7 has been developed to demonstrate increasing and decreasing returns to scale with respect to size of ten selected schools.

Table 6.6 : Unit Cost of Education According to Size of Schools

School Code	Enrolment	Total Cost TC (₦)	Average Cost AC (₦)
0	1	2	3
GROUP I			
29	644	135,849	210.94
06	773	179,564	232.29
09	791	186,900	236.28
07	835	201,095	240.19
22	898	233,669	260.21
13	1,040	148,024	253.90
GROUP II			
18	105	39,765	378.71
01	286	65,410	228.70
21	293	60,960	208.05
17	336	53,345	158.77
04	508	65,245	128.43
23	681	81,944	120.32
GROUP III			
28	297	77,827	262.04
02	536	90,507	168.85
14	631	97,887	155.13
16	683	132,174	193.52
GROUP IV			
11	665	106,954	160.83
19	674	220,123	326.59
03	865	123,206	142.43
GROUP V			
12	1,040	340,563	327.46
15	632	124,712	197.33
30	683	86,919	127.26
26	689	130,938	190.04
10	1,218	227,426	186.72
GROUP VI			
08	640	180,059	281.34
24	656	163,532	249.28
27	712	131,613	184.85
25	731	133,390	182.47
05	889	163,403	183.81
20	976	169,457	173.62

Table 6.7 : Average Cost of Education for 10 Selected Schools

School Code	Enrolment	Total Cost (TC in ₦)	Average Cost (AC in ₦)
0	1	2	3
18	105	39,765	379
01	286	65,410	228
21	293	60,960	208
17	336	53,546	159
04	508	65,245	128
29	644	135,849	210
06	773	179,564	232
09	791	186,900	236
07	835	201,095	240
22	898	233,669	260

It is observed from Table 6.7 that unit cost decreases with increase in the size of the first five schools and then increases with an increase in the size of the remaining five schools. This is also illustrated in the graph on the next page.

In concluding this chapter, a comparative analysis of some case studies on unit cost is presented in the following section (Table 6.8).

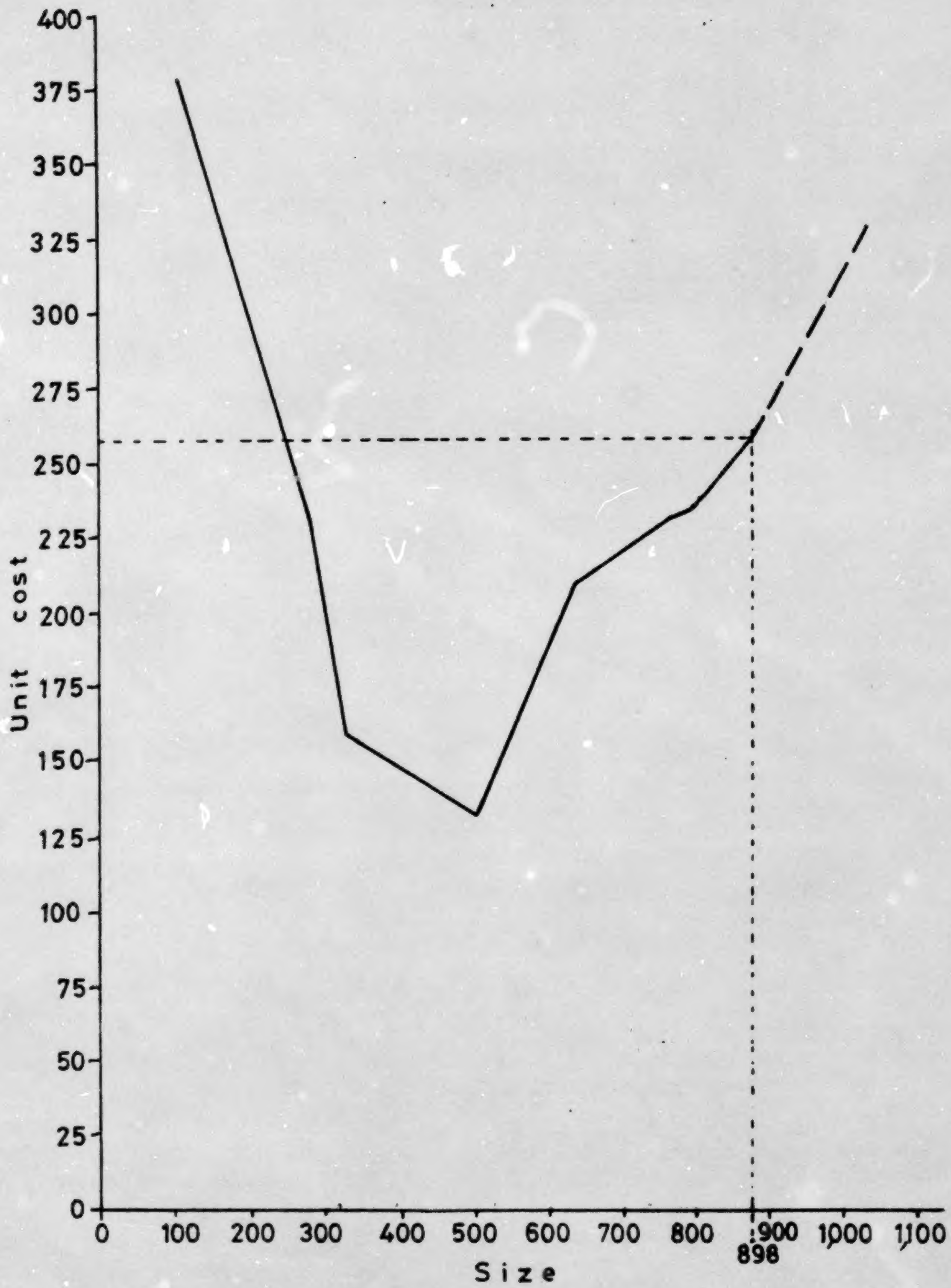


Fig. 6.1: Cost-size relationship of secondary schools

Table 6.8 : Comparative Analysis of Unit Cost of Secondary Schools in Selected States in Nigeria around 1979

S/No.	Investigator (Source)	State	No. of Schools	Unit Cost (₦) Lowest	Highest	Ratio Between Lowest & Highest Unit Costs
0	1	2	3	4	5	6
1	Present Study	Oyo	30	120.00	378.00	1:3.15
2	Hough (1980)	(a) Bendel Owan LGA	5	89.4	157.00	1:1.75
		(b) Bendel Oredo LGA	7	154.2	382.10	1:2.47
		(c) Ogun Abeokuta	10	91.1	213.90	1:2.34
3	Olaniran (1980)	Ogun	8	139.6	174.3	1:1.24
4	Gwani (1979)	Kaduna	1	168.58	-	-
5	Ogunwale (1979)	Oyo	4	227.05	277.16	1:1.22

Comparative Cost Analysis

Some case studies on unit cost have been conducted in some states in Nigeria. These case studies are reviewed in Chapter Two of this thesis. In this section, we shall look at the trend of unit cost of education as established by these studies.

Table 6.8 gives the unit cost as reported by Hough (1980), Olaniran (1979), Gwani (1979) and Ogunwale (1979).

From the table, it is observed that the ratio between the lowest and the highest unit cost as revealed by the present study was 1:3.15. This ratio is quite high compared to the other studies where the ratio varied from 1:1.2 to 1:2.5. When we analyse the whole data together, it is observed that the lowest and the highest unit costs were very close when the number of schools selected for study was small, but it increased with increase in the size of the sample of schools. For example, the present investigation which covered a maximum number of schools (30) has the highest ratio between the lowest and the highest unit cost. It is however, clear, that there are wide variations in the unit cost of secondary education as revealed by the different studies and this may be noted.

The next chapter is devoted to the analysis of unit cost in relation to factors which determine its size.

CHAPTER VII

ANALYSIS OF FACTORS INFLUENCING UNIT COST OF SECONDARY EDUCATION

In the preceding chapter, the focus of this study has been on the analysis of the structure of current cost of education, variations in unit cost according to individual institutions, and unit cost per student year in urban and rural areas.

Usually, the cost analyst is not interested in costs in isolation, but in relation to other elements. One of the most basic of such relationships is between costs (inputs) and output; and techniques such as cost benefit analysis, cost effectiveness analysis and productivity measurement have been used in establishing these relationships. However, in this chapter, the primary interest lies in the relationships between unit cost and some important factors (determinant variables) which cause its variability.

Certain factors, notably, the size of a school (enrolment), average teachers' salary, student-teacher ratio, class size, the percentage of trained teachers in a school and the age of a school, tend to influence the unit cost of education. Table 7.1 presents factors determining unit cost in the 30 selected secondary schools in Oyo State, 1978/79.

The present analysis seek to identify which of these factors are crucial in the determination of unit cost

Table 7.1 : Factors Determining Current Cost in Selected Secondary Schools in Oyo State, 1978/79

S/No.	Age of School	Size of School	Average Class Size	Student/ Teacher Ratio	% of Teachers Salary	Average Teachers Salary	Unit Cost (₦)
0	1	2	3	4	5	6	7
1	3 yrs	286	37.8	15.1	80.0	2205.11	228.70
2	11 yrs	536	38.3	23.3	66.7	2505.82	168.90
3	13 "	865	41.2	28.8	58.0	2570.91	142.50
4	4 "	508	46.2	22.1	83.4	1715.17	128.40
5	22 "	889	36.9	23.4	64.1	3043.63	183.81
6	15 "	773	35	22.7	65.7	3930.59	232.29
7	25 "	835	36	17.0	72.0	3039.88	240.00
8	15 "	640	42.7	20.6	51.1	4861.60	264.90
9	24 "	791	37.7	26.4	64.7	4371.73	236.20
10	30 "	1218	45.1	30.5	51.3	4215.34	186.60
11	6 "	665	36.4	33.3	61.9	3045.60	160.70
12	31 "	1040	36.5	17.3	52.5	4458.07	327.50
13	8 "	538	46.5	17.1	81.6	2795.45	253.80
14	23 "	631	35.1	21.8	80.0	2607.89	156.57
15	20 "	632	35.1	21.1	87.1	2582.86	197.17
16	16 "	683	40.2	29.7	66.7	4117.52	193.40
17	4 "	336	37.3	18.7	73.6	1784.59	158.90
18	2 "	105	35.0	8.1	85.7	1998.92	378.80
19	21 "	674	37.4	21.1	51.5	5456.43	326.59
20	11 "	976	39	25.0	65.0	3222.23	173.60
21	15 "	293	32.5	12.7	62.5	1815.39	207.90
22	48 "	898	44.9	20.4	64.0	3684.95	260.10
23	20 "	681	37.8	48.6	83.3	3630.15	120.00
24	20 "	656	38.6	22.6	76.7	3514.69	249.30
25	21 "	731	37.7	45.7	50.0	5688.81	182.60
26	15 "	689	36.3	22.2	75.0	3273.41	190.00
27	12 "	712	44.5	24.6	60.0	3052.17	184.80
28	5 "	297	34.9	10.2	63.4	1873.53	262.10
29	24 "	644	35.8	22.2	83.3	3288.98	210.90
30	24 yrs	683	42.7	29.7	70.8	2274.17	127.26

cost of education. The analysis has been carried out in in two stages:

First, simple regression analysis is carried out to show the effect of each of the determinant variables on the unit cost; and secondly, a stepwise regression (partial correlation) is applied to find out the relative contributions of the determinant variables to the unit cost. Table 7.2 presents the linear regression of unit cost on the determinant variables.

Table 7.2 : Linear regression and product moment Correlation of unit cost and the Determinant variables.

S/No. 0	Determinant Variables 1	α 2	Reg. Wts. 3	r 4	Exp. Var. 5	F 6
1	Age (X_1)	199.931	0.602	0.098	0.9	0.269
2	Enrolment (X_2)	240.725	-0.046	-0.179	3.2	9.923
3	Class Size (X_3)	325.380	-2.978	-0.184	3.4	0.978
4	Student-teacher ratio (X_4)	309.680	-4.255	-0.598	36.0	15.523*
5	Qualification of teachers (X_5)	259.676	-0.725	0.134	1.8	0.509
6	Average teachers Salary (X_6)	157.507	0.016	0.288	8.3	2.522

*P > .05

α - Constant

Reg. Wts. - Regression weights

r - Pearson's product moment correlation coefficient

Exp. Var. - Explained variation.

As revealed in Table 7.2, the variables affect the unit cost in different forms. It is observed that while some of the variables show positive correlation (X_1, X_6), the others (X_2, X_3, X_4, X_5) displayed inverse relationship with the unit cost. It follows that while increase in the first set of variables increased unit cost, increase in the second set of variables reduced the unit cost. It may be noted that only one of the variables (X_4) emerged with point high enough (cut out point at 0.5) to affect unit cost significantly on its own. The remaining variables show little influence on the unit cost with explained variation of between 2 to 3 percent only.

Discussions

Generally, the findings in this analysis agree with views on these variables; but in a few cases, the findings disagree. Age of school (X_1) for instance is expected to reduce unit cost since older schools usually are more firmly established with larger enrolment and the fixed cost is expected to spread out more, thus resulting in reduced unit cost. On the other hand, newer and smaller schools utilize more or less the same amount of fixed cost (use of buildings, equipments and maintenance of buildings) and thus incur high unit cost. In the present result, age showed a low positive correlation with unit cost. It is observed that a unit addition to age of school increased unit cost by ₦0.60. However, the F. value of the regression coefficient is not significant at 5 percent level. It is seen that the age factor (X_1) does not significantly influence unit cost of education. The total percentage of variation in unit cost due to age is only about 1 percent. This result is however not surprising since capital cost is not included in the analysis.

A larger enrolment (X_2) is believed to have a tendency to reduce unit cost substantially. Infact, Lakadawala[1] categorically stated that size (enrolment) was the crucial factor in the determination of cost of education. It is generally believed that the larger the enrolment of an institution, the greater the chances for its resources being optimally used. The present analysis corroborates with this conception of the enrolment factor to the extent that an increase in enrolment would invariably reduce unit cost. However, the result in Table 7.2 shows that enrolment is not the most crucial factor in the determination of unit cost.. As revealed in the analysis, a unit increase in enrolment decreased unit cost by only ₦0.04 (4 kobo). It is also observed that the addition of size variable (X_2) in the equation is only 3 percent, which again shows little influence on the unit cost.

Class size (X_3) is conceived of as a factor for which increase will result in lower unit cost. The general belief is that an average of 40 students in a class will result in an optimum utilization of the classrooms, and at the same time allow for effective teaching situation. The present findings support this conception about class size. It is seen that one unit increase in class size reduced the unit cost by about ₦3.00. Thus, large classes would invariably decrease unit cost of education. However, it is found that the F. value of the regression co-efficient is not significant at 5 percent level. In other words, at .05 cut out point, class size is not considered a significant factor influencing unit cost of education.

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[1] Lakadawala, D.T. and K.P. Shah "Op cit"

The present finding in relation to student-teacher ratio (X_4) is very outstanding. The factor (X_4) emerged as the only significant factor at the cut out point of .05. It is seen that a unit increase in student-teacher ratio reduced the unit cost by as much as ₦4.25. Its contribution to the total variation amounted to 35 percent.

A high percentage of trained teachers (X_5) in a school is expected to increase the unit cost of education. This is because the salaries and allowances of trained teachers are usually higher than those of the untrained teachers. The present finding is contrary to this view. As revealed in Table 7.2, the unit cost decreased with an increase in the number of trained teachers. It is observed that the employment of one more trained teacher reduced unit cost by ₦0.75. However, the F-value of the regression co-efficient is not significant at 5 percent level. So, with a contribution of only about 2 percent, the qualification factor (X_5) would not significantly affect unit cost of education.

The finding on the average teachers' salary (X_6) is interesting. While the finding confirms the general view that an increase in average teachers' salary would result in a corresponding increase in unit cost, we find its contribution of 8.3 percent relatively low, bearing in mind that teachers' salary usually form the largest portion of current cost of education. It is found that a unit increase in the average teachers' salary increased the unit cost by only ₦0.02 (2 kobo).

The findings in the first stage of this analysis have shown the strength of relationships between unit cost and the determinant variables taken separately. In order to determine the relative contributions of the different factors influencing the unit cost, the second stage of our analysis (stepwise regression) has been carried out.

Table 7.3 presents a multiple regression of unit cost and the determinant variables.

It is observed that average teacher's salary (X_6) and student-teacher ratio (X_4) turned out to be the most important variables in terms of contribution to the explained variation. In fact, average teacher's salary (X_6) explained 39 percent of the total variation and student-teacher ratio explained 36 percent of the total variation. The other factors contributed only a little over 6 percent of the total variation.

In terms of statistical significance of regression co-efficients, only X_4, X_6 and X_2 are found to be significant at 5 percent level.

Table 7.3 : Relative Contribution of Factors Influencing Unit Cost of Education

S/No.	Determinant Variables	Reg. Wts.	R^2	% Contribution	F
0	1	2	3	4	5
1	Student-teacher ratio (X_4)	-6.005	0.357	36	57.077*
2	Average teacher's salary (X_6)	0.049	0.742	39	36.946*
3	Enrolment (X_2)	-0.084	0.793	5	4.255*
4	Qualification of teachers (X_5)	0.529	0.801	0.8	0.617
5	Age of School (X_1)	0.517	0.804	0.3	0.389
6	Class size (X_3)	0.221	0.805	0.02	0.019
7	Constant	193.121	-	-	-

*$P > .05$

Reg. Wts. - Regression Weights

In terms of magnitude of the weight of regression co-efficients, student-teacher ratio turned out to be the most powerful factor in reducing unit cost of education. (see also Table 7.2). A unit increase in the student-teacher ratio is expected to reduce unit cost of education by ₦6.0. (Table 7.3, Column 2). Other factors in order of their importance are X_2, X_5, X_1 and X_3.

In terms of direction of influence of the individual factors on the unit cost, it has been possible, through the multiple regression analysis to establish a positive correlation of X_5 (Qualification of teachers) and the unit cost. It may be recalled that in the linear regression analysis presented in Table 7.2, the direction of the contribution of X_5 was found to be unexpectedly negative. However, the direction of influence of X_1 and X_3 is positive.

From the on-going results therefore, it could be concluded that the factors crucial to the determination of unit cost of education are student-teacher ratio (X_4), average teacher's salary (X_6) and enrolment (X_2).

Furthermore, attempt is made to study the effect of two of these factors (X_2 and X_6) on the cost of education in the following sections.

(i) Optimum size of School and Unit cost

On the basis of the analysis in the preceding sections, it has not been possible to establish in clear terms the relationship between size and unit cost of education. This aspect has been examined in this section, using quadratic models with the data collected from the Central Schools Board on 230 schools. (see Chapter Three).

The results are presented below: first in respect of 60 schools selected for the study and thereafter, in respect of all the 230 schools according to grades of schools (grades I, II, III).

(a) 60 selected schools:

$$Y = 257.66 - 0.225\ E + 0.000165\ E^2$$

(b) Grade I schools:

$$Y = 952.687 - 1.718\ E + 0.00947\ E^2$$

(c) Grade II schools:

$$Y = 599.359 - 1.077\ E + 0.000716\ E^2$$

(d) Grade III schools:

$$Y = 328.065 - 1.031\,E + 0.001459\,E^2$$

Where - Y = Unit cost

E = Enrolment

These results are presented in graphs (Fig. 7.1 and Fig. 7.2).

From the graph (Fig. 7.1) it is seen that the average cost curve changes its direction upwards when the school size is 682 and corresponding unit cost is ₦180.99 In respect of Grade II schools, it is clear (Fig. 7.2) that unit cost decreases as size of school increases. Optimum size of a school occurs within grade II schools between enrolment of 682 and 780 and corresponding unit costs between ₦190 and ₦200. The peak in optimum size of schools is seen in the Grade I schools.

(ii) Teacher cost by Training and Age

In the analysis of teaching staff in Chapter Five, it is found that teacher cost constitutes the single most important factor in the recurrent cost of education. In this section, attempt is made to study the behaviour of teacher cost in relation to training and age of teachers.

Table 7.4 gives the average annual earnings of teachers according to age groups.

As shown on Table 7.4, age-earning profile of teachers increases with age. It is seen that trained graduates have higher earnings profile all along except at the beginning. Similarly, trained-non-graduate

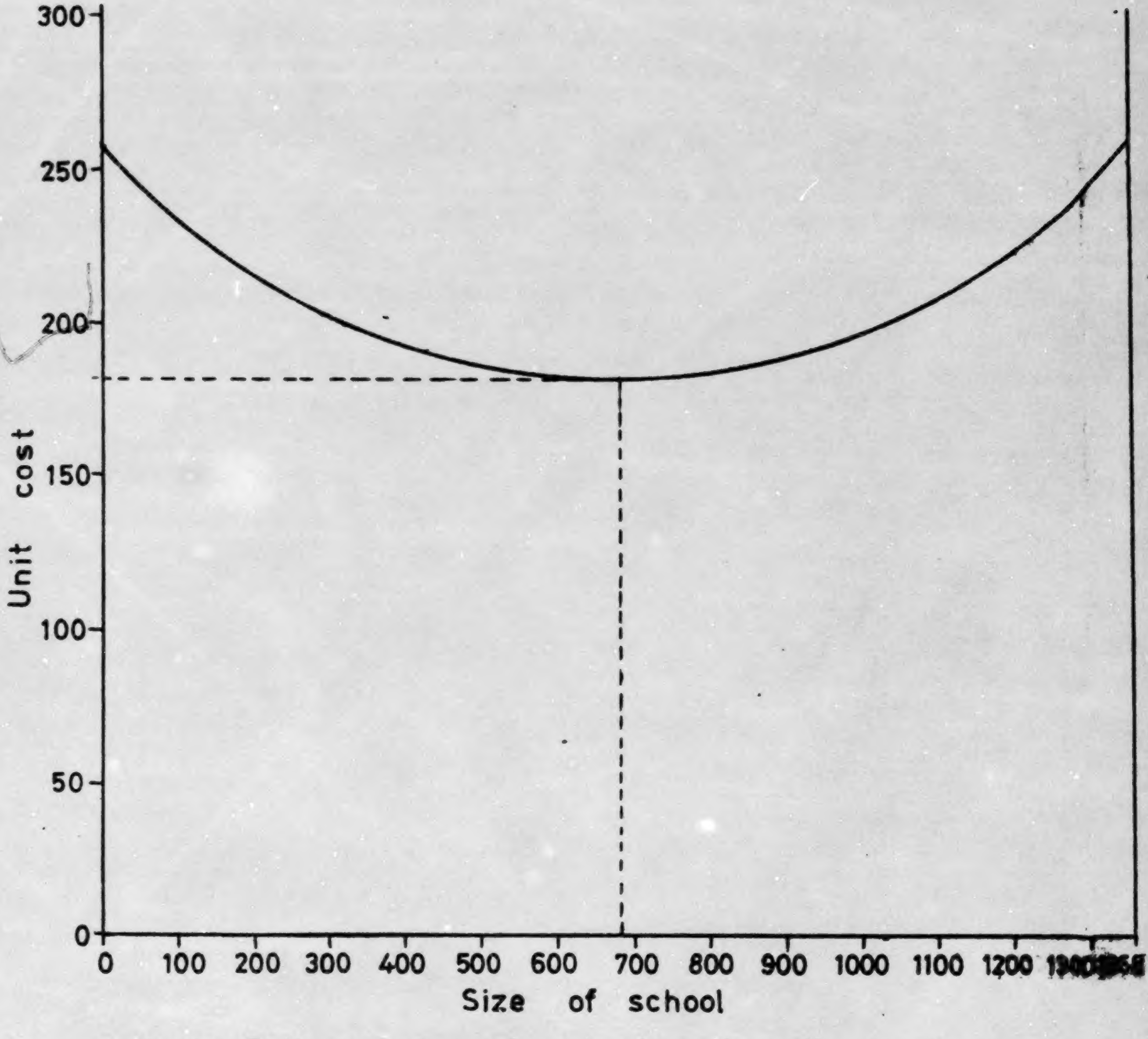

Fig. 7.1: Optimum size of school and unit cost

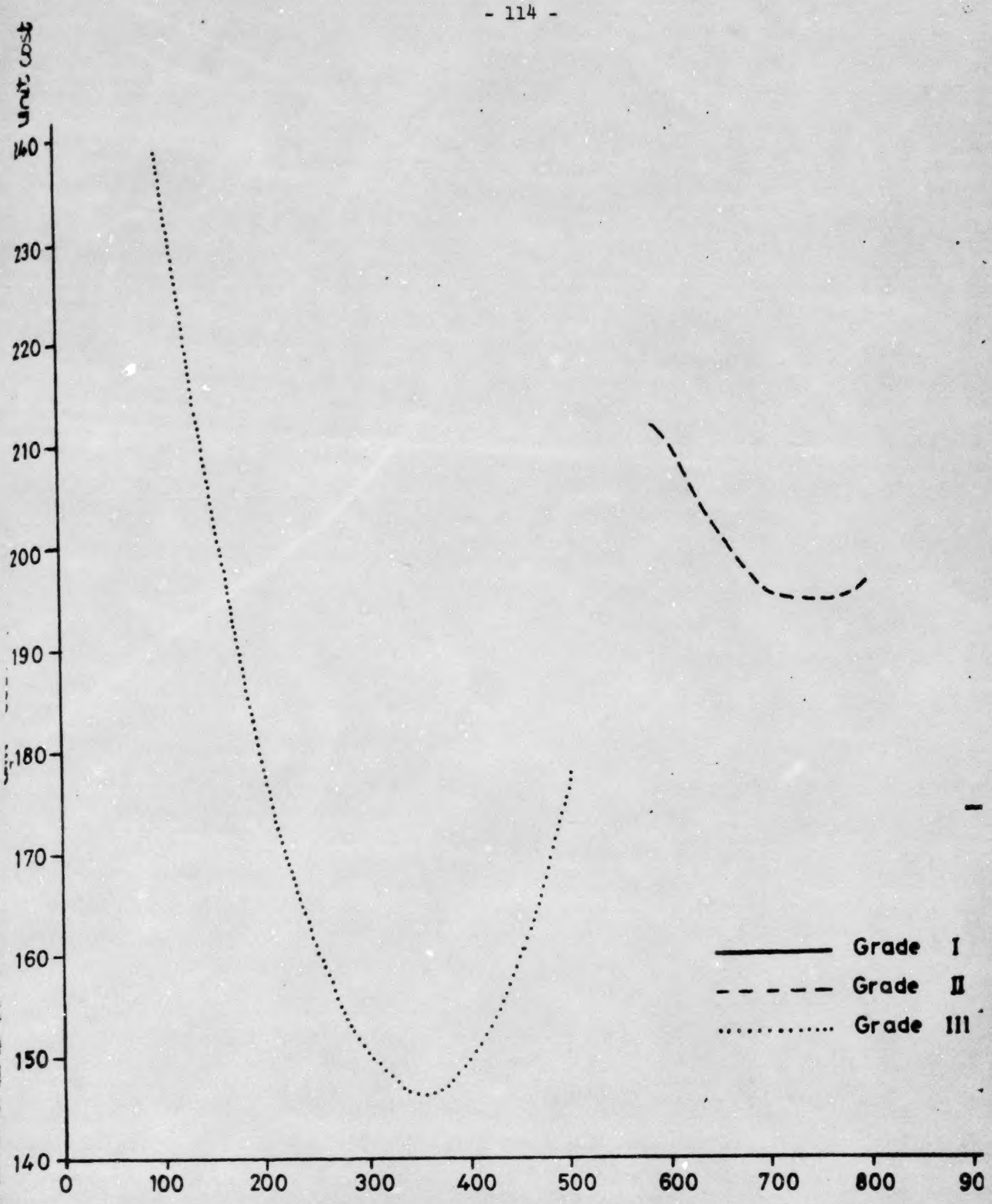

Fig.7.2: **Size - unit cost relationship by categories of**
1978/79

Table 7.4 : Age-Earnings of Teachers by Education and Training in Oyo State 1978/79

S/No.	Age Group	Trained Graduates (₦)	Untrained Graduates (₦)	Trained Non-Graduates (₦)	Untrained Non-Graduates (₦)
0	1	2	3	4	5
1	19 - 23	2,878	3,236	1,876	1,512
2	24 - 28	3,572	3,544	2,613	1,551
3	29 - 33	4,494	3,661	2,955	1,751
4	34 - 38	5,330	4,566	4,016	1,965
5	39 - 43	7,573	5,468	4,623	3,247
6	44 - 48	8,241	8,084	5,160	-
7	49 - 53	8,754	8,857	6,880	-
8	54 - 58	9,226	-	7,596	-
9	59 - 63	7,391	-	-	-
	All Ages	287,295	187,080	178,595	50,130

teachers have higher earnings profile as compared to the untrained non-graduates. It is observed that additional training both for graduate and non-graduate raises their earning profile and in terms of cost, this implies more cost to the educational establishment. It is believed that as a result of training programmes and higher qualifications, educational cost is bound to rise not only in the short run when teachers are appointed but throughout their service period in the education system. This

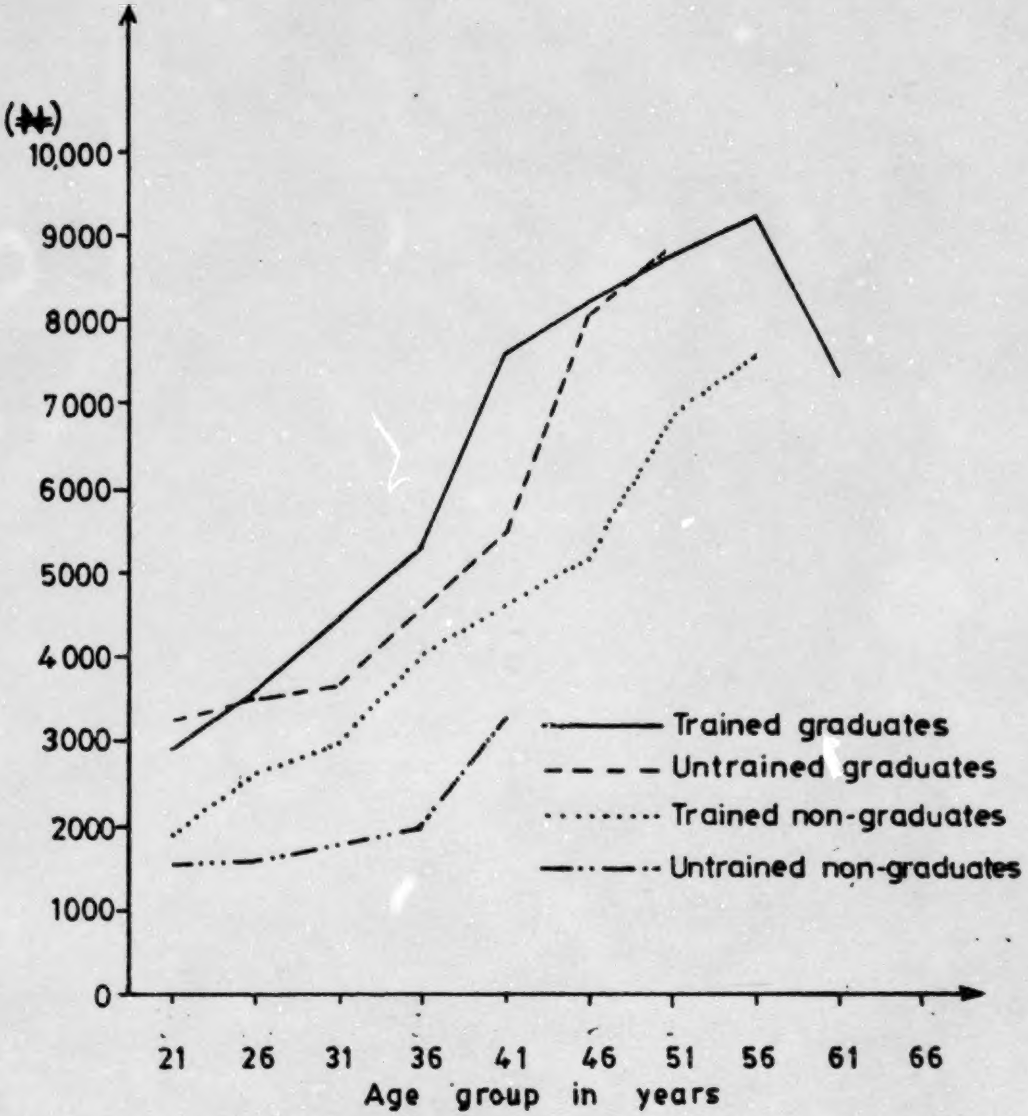

Fig. 7. 2: Age - earning relationship of teachers

long range cost implication of employing teachers is not always taken into consideration by educational planners as this is often done when deciding about capital projects such as buildings and equipments. The differences in age-education/training-earnings profiles may be seen in the graph (Fig. 7.1). The unbroken line (trained graduates) went up sharply over the earnings of the untrained graduates (broken line) dropping sharply again at the peak earning of ₦9,000 at the age of between 45 and 50 years. The earnings of the trained non-graduates came up gradually, reaching a peak earning of more than ₦8,000 at the age of about 50 years.

Furthermore, a linear regression between age and four categories of teachers has been carried out to show clearly the effect of age of teachers on their earnings.

Table 7.5 presents the linear relationship between age and earnings of four categories of teachers.

Table 7.5 : Regression of Age on Four Categories of Teachers

S/No.	Categories of Teachers	α	Regression Weights	r	% Contribution	F
0	1	2	3	4	5	6
1	Trained graduates	629.390	187.359	0.871	76	100,327*
2	Untrained graduates	38.136	123.459	0.861	74	59.936*
3	Trained Non-graduate	-969.396	132.024	0.911	83	160.936*
4	Untrained Non-graduate	863.360	26.380	0.515	26	5.040*

*P ≤ .05

As revealed on Table 7.5, the influence of age on earnings has been greatest in respect of the trained non-graduate teachers which explains 83 percent of the co-efficient of variation. This category of teachers are largely holders of National Certificate of Education (NCE) which is highly recognised in the teaching profession. We also found that age has the least influence on the earnings of the untrained non-graduate teachers. This result is not surprising because this category of teachers, mainly holders of school certificate (SC) and Higher School certificate (HSC) are not recognised as qualified teachers. The earnings of the untrained non-graduate teachers thus remain low inspite of age (or experience) of these teachers.

In this chapter, we have seen the relative contribution of the various factors which determine the unit cost of education. While student-teacher ratio (X_4) has emerged as most influencial to unit cost, factors such as enrolment (X_2) and average teacher salary (X_6) also have considerable effect on the unit cost of education. Further analysis of enrolment in relation to unit cost; and of age in relation to earnings of teachers have also shown the long run effect of these factors on the cost of education.

The next chapter is devoted to the discussions of the findings and conclusions in all the analysis in this study.

CHAPTER VIII

MAJOR FINDINGS AND CONCLUSIONS

This study employed two main approaches to identify the important elements of cost, which could be manipulated to effect maximal utilization of resources to education. A synthetic indicator and unit cost as a partial indicator approaches were used to diagnose disparities in secondary educational development in Oyo State with a view to highlighting the areas most needing school facilities.

Also, a linear and multiple regressions were employed to find out the crucial factors influencing the unit cost of education. In this Chapter, the major findings that emerge are discussed and their implications for educational planning examined. Limitations of the study and areas of further research are also discussed.

Findings in respect of Disparities:

The first part of this study was devoted to the diagnosis of educational disparity in secondary education in Oyo State. Nine indicators were used (see Chapter IV). Indicators 1-6 represent quantity development index, that is, these indicators project quantitative aspect of educational development. These are:

- Student per 1,000 population (R_1)
- Percentage of primary to secondary students (R_2)
- Ratio of primary to secondary schools (R_3)

- Secondary school catchment radius (R_4)
- Citizens to secondary school ratio and (R_5)
- Average number of students to secondary school (R_6)

On the other hand, indicators numbered 7-9 are quality indicators. These are:

- Student-teacher ratio (R_7)
- Average cost per school (R_8)
- And the average cost per citizen (R_9)

Indicator I has shown that Oluyole, Ibadan, Oranmiyan and Ilesa Local Government Areas have the highest ratio of students in the population while Irepo, Irepodun, Lagelu, Iwo, Ogbomosho, Akinyele, Odo-Otin, Ila and Kajola Local Governments have below 10 percent each. On the whole, the mean for the 24 Local Government Areas is 13.9 which is an indication of overall poor student per citizen enrolment in the state. R_2 and R_3 again indicates a greater need of school facilities in those areas mentioned above. Ilesa Local Government Area has the best ratios. R_4 shows inequality in land area per Local Government Area in Oyo State. LGAs with many schools but have small land area are characterised by a very low catchment radius e.g. Ilesa and Ibadan, whereas larger areas with fewer schools tend to have higher catchment radius. The latter happens more often in rural areas. The co-efficient of variation of 64.3 explains the uneveness of land area per school in the state. In general, the less priviledged Local Government Areas in terms of access to education seem to out-number the more priviledged ones.

Student-teacher ratio (R_7) is dependent on the number of teachers per LGA and the students enrolment. The ratio is on the whole low in the state with a mean of 26.1. It may be mentioned that while this indicator may be considered as quality indicator in educational development, it may at the same time indicate under utilization of resources (in teachers' time) especially in the rural areas where students enrolment are generally low.

In Table 8.1, we present a summary of quantitative and qualitative indicators in the 24 Local Government Areas of Oyo State.

Table 8.1 : Summary of Quantitative and Qualitative Indicators in the 24 Local Government Areas in Oyo State, 1978/79

S/No.	Indicator	Co-efficient of Variation (%)
1	R_1	13.8
2	R_2	55.95
3	R_3	64.3
4	R_4	52.7
5	R_5	38.0
6	R_6	65.0
7	R_7	21.7
8	R_8	17.1
9	R_9	13.8

The table shows the lowest co-efficient of variation in R_7 with 13.8 percent, R_8 with 17.5 percent and R_6 with 21.7 percent. The indication shown by R_6 is that most of the schools in the 24 Local Government Areas are scattered in the rural areas and as indicated by R_7, there is low enrolment for most of these schools because student-teacher ratio is low. Besides, the average cost per school seems to be predominantly influenced by quality of teachers since the bulk of qualified teachers tend to work in urban areas. The highest of the indicators R_4, shows that secondary school catchment radius is very wide. This indicates the need to bridge the wide gap in catchment radius indicator. R_1 seems to indicate that, of the total citizens in the 24 Local Government Areas, only about half of qualified citizens have access to secondary education. This again is confirmed by R_5.

Analysis of Enrolment and Teachers

The analysis carried out in Chapter V has revealed that the annual growth rate in enrolment in secondary schools in 1978/79 was 14.9. The growth rate of enrolment for girls was higher in the rural areas than in the urban areas. This result may be due to the dying practice in the education of girls in some parts of the country whereby girls have been deprived of secondary education. In general, enrolment at the secondary level is spreading to areas which earlier on had been neglected.

Student-teacher ratio in urban schools was 22.3 as against 23.9 in rural areas. On the whole, student teacher ratio is low in the state. The average number of teachers per class was 1.7 in rural schools as against 1.9 in urban schools. It ranges from 1.0 to 2.0 in rural schools and .8 to 3.8 in urban schools. In effect, this means probably that some teachers are either not teaching or were given limited number of periods to teach while receiving their full pay. In terms of resource utilization, this may be very uneconomical.

There are more trained teachers in the urban schools than in the rural areas; the reason being that most trained teachers prefer to teach in the big cities where modern amenities are available. It appears, therefore, that many teachers in the rural schools have been teaching subject matters for which they have received no training. This adds a qualitative dimension to this issue of the use of teachers for the state.

Unit Cost Analysis

In Chapter VI, the analysis of 30 secondary schools current expenditure for 1978/79, showed that out of total current expenditure of ₦4.15 million, salaries alone got 91.21 percent while maintenance expenditure formed only 1.81 percent of the total current expenditure. It is also found that teachers salaries are higher in urban schools than in rural schools. The average unit cost per student year varies from ₦159.36 to ₦236.28 in rural schools and from ₦120 to ₦378.71 in urban schools. The average unit cost per school year in both urban and rural schools put together amounted to ₦205.43.

A comparative analysis of some past studies in selected states of Nigeria, showed that the lowest and the highest unit costs were close when the sample of schools was small but the ratio increased with large samples of schools. It will be worthwhile to find out more about the average unit cost of secondary schools with a large sample. As it is now, there are wide variations in the unit cost of this level of education in Oyo State.

Unit Cost and the Determinant Variables

The primary goal of this analysis is to identify which of the determinant variables significantly influence the unit cost of education.

Student-teacher ratio on its own contributes highest to variance in unit cost. It is observed that one unit increase in student-teacher ratio decreased unit cost by as much as ₦4.25. It may be noted that while a small student-teacher ratio may be adequate for effective teaching learning condition, but for economic reasons, this factor needs to be watched.

Next in importance is average teachers' salary. This factor came out with a low contribution of 1.8 percent in the first stage of the analysis but surfaced with a much higher contribution of 39 percent in the second stage of the analysis. This is probably due to the strong influence of student-teacher ratio which was held constant in the second analysis, and since both factors have a common link with teachers.

Enrolment is next in importance. It contributes just 5 percent to variance in unit cost. This result is particularly striking as it is generally conceived that size of school has great impact on the cost of education. It is clear from this result, based on the sampled schools, that size of school would not on its own significantly affect unit cost, although large enrolment will invariably reduce cost. However, in a further study of size-cost relationship, it is found that economy of scale exists in the secondary schools. The optimum size of school in this study came to 682 with a corresponding unit cost of ₦180.99. These findings are generally in agreement with some of those earlier studies. For example, Hirsch (1959), Chesswas (1972) identified teachers salary as one of the crucial factors in the determination of total recurrent cost of education. Cummings (1971) found evidence of economies of scale in the primary schools. The regression showed that the other factors such as age, qualification of teachers, and class size have little influence on unit cost. On the whole, the result of the analysis has been outstanding as it has been possible to see the contributions made by all the determinant variables and it has emphasized the most crucial factors.

Implication of the Findings

The primary objective of this work has been to assist the policy maker in future decision making for educational expansion. In respect to determining and controlling the level of educational expenditure, we have been able to identify six major factors which in different forms influence unit cost of secondary education. In effect, the policy maker is able to manipulate any of the identified factors (X_1, X_2, X_3, X_4, X_5, X_6) to accomplish his goal. It is found, for example, that size of school (X_2), which has always been regarded as crucial to cost control is not significant enough on its own to influence unit cost of education. Contrary to this assumption, we have discovered that student-teacher ratio (X_4) has a greater influence on unit cost, and infact turns out to be the most crucial of all the six factors. Therefore, for purpose of cost control, this study has provided the planner a guide as to what factor to watch. That is, to control cost, the student-teacher ration is the best instrument.

Limitation of the Study

In order to answer the question posed by the present study, there is need to undertake an extensive study of the nation's economic and educational system, which this study cannot cope with because of financial and time constraints. We have therefore decided to undertake a study limited to Oyo State secondary level of education with the hope that the conclusions reached will provide insight into the nature and dimensions of the problems posed by the fast growing secondary education sector in the state and in the country as a whole. Oyo State was chosen for the study because it is the second largest state in the country; and also because of the state's proximity to the study centre, the University of Ibadan. The state is also one of the five states which now have embarked on free secondary education.

The study has been limited to the analysis of current costs rather than total costs because of difficulties in obtaining reliable data on capital cost. In the course of our investigation into this aspect of cost of secondary education in Oyo State, many problems came up which made the inclusion of capital cost difficult. We discovered, for example, that no systematic record was available to indicate cost of site, or information about ownership in most of the schools' under survey. Furthermore, valuation of schools' sites are mostly determined by their locational factors which again posed various complex problems due to subjective valuation variations in cost of land within local governments. It was also difficult to get information on the historical or replacement cost of building and equipments used in these schools.

However, capital cost will not constitute impediment to the achievement of the goal of the present study. For our purpose, current cost consists of the varying elements of cost which invariably influence the size of educational cost. If the aim of the analysis had been to estimate the total cost of education, as is usually defined, this would have been a serious omission since interest payments and depreciation are usually included. However, the aim of this analysis is to see the effects of different factors, and therefore, only that part of cost assumed to be sensitive to these factors need necessarily be included in our cost model.

In regards to the coverage of the study, 60 schools, approximately 25 percent of the total number of secondary schools in the state during 1978/79 academic session, were selected for the study. The selection covered all the 24 Local Government Areas of Oyo State. We believe that this population will show the trend of similar problems in the other states of the country.

Further Research

In the process of answering the few research questions which the present investigation has raised, many other questions have come up and each of these questions is considered a potential fertile area for further research.

As mentioned in the limitation of this study, the problem posed for this project is such that would need an extensive study of the whole educational system of the nation. Although the findings of the present study on secondary education in Oyo State may provide useful guides to policy makers/planners in Oyo State and also in the other states of Nigeria, it is recommended that investigation of this kind, at secondary level of education, be carried out in all states of Nigeria, and infact, at national level.

In our analysis of factors influencing cost of secondary education, some of the results obtained proved contrary to general assumption about some of the factors. For example, the present analysis showed that teacher qualification was not significant in the test of co-efficient of correlation at 5 percent level. We feel that this result could be different if teacher experience is observed with qualification of teachers. It follows that while qualification of teachers automatically increase teachers' earning, more experienced teachers may well be earning more. It is therefore suggested that teacher qualification and teacher experience be observed together as one factor determining unit cost of education.

In the same way, age of school has been found to have very little effect on the unit cost of education. It was discovered in the course of the analysis that this result could be different if analysed with capital cost. This is because the influence of age on unit cost comes mostly through the cost of maintaining equipments (laboratory, teaching aids) and through the actual cost of capital items (buildings). However, our result has shown that maintenance expenditure is negligible in secondary schools. It will be worthwhile to find out whether the contribution of age as a factor will change when analysed with capital cost.

Recommendations

The present investigation has clearly shown the importance of micro data on costs, expenditures and use of resources in order to understand the ways in which costs can be controlled in the future; to draw the attention of planners on the need of using resources more effectively; to understand the potential for economies of scale; and to understand the factors explaining disparities in unit expenditure between different schools and between different local government areas. It is recommended that micro level cost analysis be intensified in Nigeria as a whole as this is one of the effective ways of assisting the planner in the projection of future resources for education. Macro data which is usually derived from budgetary sources cannot be of much assistance unless it is complemented by micro data.

The findings of this investigation have proved that it is possible to obtain acceptable data on school expenditures and financing, if information is collected directly at the school level. It is therefore recommended that a permanent information system on school expenditure and financing be established in all states and at the national level. It would be important now, to establish this information system in such a way as to have for each year, a representative picture of school expenditures and financing in Oyo State and in Nigeria as a whole.

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